Mercedes-Benz

The Mercedes-Benz S 63 AMG

Press Information

Driving Performance in the luxury segment

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The descriptions and information in this press kit apply to the international model range of Mercedes-Benz and may vary from country to country.

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Driving Performance in the luxury segment

Mercedes-AMG is unleashing the new S 63 AMG: the most powerful high-performance saloon in the luxury segment sets new standards in terms of driving dynamics, lightweight construction and efficiency. The guarantor of effortlessly superior performance is the AMG 5.5-litre V8 biturbo engine delivering 430 kW (585 hp) and 900 newton metres of torque – the most powerful member of the BlueDIRECT engine family. Thanks to systematic lightweight construction based on the "AMG Lightweight Performance" philosophy, the S 63 AMG tips the scales at up to 100 kilograms less than its predecessor. The combination of an efficient drive system and reduced weight results in an NEDC combined fuel consumption of 10.1 to 10.3 litres per 100 kilometres. The new S 63 AMG is also available for the first time with the performance-oriented AMG all-wheel drive system 4MATIC as an option. This not only enhances traction – the S 63 AMG represents a new dimension in driving dynamics in its segment. The design, equipment and appointments of the S 63 AMG meet the highest standards in terms of high-class appeal, quality and perfection.

Systematic implementation of the AMG Lightweight Performance strategy reduces the weight of the S 63 AMG by up to 100 kilograms compared to the predecessor model. This weight saving was achieved largely thanks to the use of a lightweight lithium-ion battery, AMG forged light-alloy wheels, and a weight-optimised AMG high-performance composite braking system. Furthermore, the entire outer skin of the S-Class, including the roof and the front end of the body, is made of aluminium. Installing a spare wheel recess made of carbon-fibre, a material used in Formula 1, reduces the weight by a further four kilograms.

The S 63 AMG also leads the way when it comes to power-to-weight ratio, boasting a figure of 3.37 kg/hp. The result is effortlessly superior performance: Acceleration from 0 to 100 km/h takes 4.0 to 4.4 seconds depending on model variant, and the top speed is 250 km/h (electronically limited).

The models at a glance:

	S 63 AMG Short wheelbase	**S 63 AMG Long wheelbase***	**S 63 AMG 4MATIC Long wheelbase**
Displacement	5461 cc	5461 cc	5461 cc
Output	**430 kW** (585 hp) at 5500 rpm	**430 kW** (585 hp) at 5500 rpm	**430 kW** (585 hp) at 5500 rpm
Max. torque	900 Nm at 2250-3750 rpm	900 Nm at 2250-3750 rpm	900 Nm at 2250-3750 rpm
Fuel consumption NEDC combined	10.1 l/100 km	10.1 l/100 km	10.3 l/100 km
CO_2 emissions	237 g/km	237 g/km	242 g/km
Kerb weight (according to EC)	1970 kg** 2045 kg***	1995 kg** 2070 kg***	1995 kg** 2070 kg***
Power/weight ratio	3.36 kg/hp	3.41 kg/hp	3.41 kg/hp
Acceleration 0-100 km/h	4.4 s	4.4 s	4.0 s
Top speed	250 km/h****	250 km/h****	250 km/h****

* only available with right-hand drive; ** ready-to-drive condition (fuel tank 90 % full, without driver and luggage); *** ready-to-drive condition (fuel tank 90 % full, with driver (68 kg) and luggage (7 kg); **** electronically limited.

In terms of maximum output and fuel consumption, the AMG 5.5-litre V8 biturbo engine remains the most efficient series-produced V8 engine of all. With an output of **430 kW** (585 hp) and a torque of 900 Nm, the AMG eight-cylinder unit from the BlueDIRECT engine family (in-house designation M 157) outperforms all comparable engines. The fuel consumption of the new S 63 AMG is up to 0.4 litres per 100 kilometres lower than that of the preceding model, even though the engine output has been increased by **30 kW** (41 hp). The range-topping eight-cylinder model already meets the requirements of the EU6 emissions standard, which is due to come into force in 2015.

Technical highlights of the AMG 5.5-litre V8 biturbo engine:

- Direct petrol injection with piezo injectors
- Biturbocharging
- All-aluminium crankcase
- Four valves per cylinder with camshaft adjustment
- Air-to-water intercooler
- Efficient cooling of engine oil, transmission oil and coolant
- Lightweight composite oil pan

- Alternator management
- ECO start/stop function

AMG sports exhaust system with exhaust flaps

The AMG sports exhaust system in the S 63 AMG has automatic logic-controlled exhaust flaps in both rear silencers. When the transmission is in "C" (Controlled Efficiency) mode, the flaps remain closed in most situations, in which case the eight-cylinder biturbo engine's sound is more understated – perfect for long trips and a comfortable ride in the rear. In "S" (Sport) and "M" (Manual) modes, the exhaust flaps open earlier and more spontaneously, especially if the driver prefers a dynamic driving style. The result is an even fuller, emotional, hallmark AMG engine sound.

Engine production in the AMG hand-assembly shop

Like all AMG V8 and V12 engines, the eight-cylinder biturbo engine for the S 63 AMG is assembled by hand in the hand-finishing section at AMG, observing the most stringent quality standards. Highly qualified engine fitters assemble the M 157 in Affalterbach according to the "one man, one engine" philosophy. Apart from serving as an AMG hallmark confirming superlative precision and production quality, the AMG engine plate bearing the engine technician's signature also attests to the peerless DNA of Mercedes-Benz's high-performance brand.

Lithium-ion battery reduces weight by over 20 kilograms

Following the SLS AMG Coupé *Black Series,* the S 63 AMG is the second AMG high-performance model to replace the conventional starter battery with a lithium-ion battery. The new technology offers numerous advantages over a conventional battery concept: With a capacity of 78 Ah, the lithium-ion battery replaces both the starter battery and the backup battery – resulting in a weight saving of over 20 kilograms. The high-performance battery is relatively insensitive to cold temperatures and has compact dimensions. The S 63 AMG is the world's first volume-produced vehicle with this type of battery concept.

Maximum individuality and custom-tailored dynamics are the strengths of the AMG SPEEDSHIFT MCT 7-speed sports transmission. The three transmission modes – "C" (Controlled Efficiency), "S" (Sport) and "M" (Manual) – provide each driver with a personal transmission setup. In comfort-oriented "C" mode the ECO start/stop function is active and shuts off the eight-cylinder engine when the car is at a standstill. In "C" mode, the driver experiences smooth transmission characteristics with comfort-oriented gearshifts. In "C" mode the car always starts in second gear.

In the "S" and "M" transmission modes the engine and transmission are significantly more agile and the ECO start/stop function is deactivated. A brief and precisely defined retardation of ignition and injection under open throttle results in even faster and acoustically more emotional gearshifts.

Performance-oriented AMG 4MATIC all-wheel drive

The optionally available performance-oriented AMG 4MATIC all-wheel drive distributes the engine torque to send 33 percent to the front axle and 67 percent to the rear axle. The rear-biased power distribution provides the signature AMG high driving dynamics and superlative driving enjoyment as well as boosting acceleration from a standing start. The all-wheel drive also enhances driving safety on wet or wintry road surfaces. Optimum traction is guaranteed by a multi-disc clutch with a locking effect of 50 newton metres, which exploits the frictional connection potential of all four wheels to the full on snow and ice in particular.

The technical basis for the AMG 4MATIC all-wheel drive system is a transfer case for the additional power take-off to the driven front axle. This requires no additional installation space, as it is integrated compactly into the AMG SPEEDSHIFT MCT 7-speed sports transmission. The torque is transmitted from the power take-off via a propeller shaft to the front axle. Power transmission from the front axle differential to the front-left drive shaft is effected via an intermediate shaft which passes through an encapsulated shaft duct in the engine oil pan. The compact and weight-optimised design results in a comparatively low level of additional weight for the all-wheel drive system of only 70 kilograms, which also helps to reduce fuel consumption and exhaust emissions.

All variants of the S 63 AMG are fitted with ESP® Curve Dynamic Assist as standard. Targeted braking intervention at the inside rear wheel results in defined cornering of the vehicle and ensures greater agility when taking corners at high speed. There is no irritating understeer when turning into corners.

Two suspension variants: AIRMATIC and MAGIC BODY CONTROL

The S 63 AMG 4MATIC is equipped with the AMG sports suspension. The full air suspension system AIRMATIC is equipped with the Adaptive Damping System ADS PLUS. One new feature is the continuous damping adjustment, which can be controlled independently in the compression stage and rebound stage. It allows better adaptation to the driving and road-surface conditions. "Comfort" and "Sport" suspension modes can be selected at the push of a button. Specific front axle kinematics – including higher camber, a larger anti-roll bar and a stiffer subframe carrier on the rear axle – have been developed exclusively for the S 63 AMG 4MATIC. These measures optimise the vehicle's agility when driving dynamically. With the redesigned front axle and the special all-wheel drive setup, the S 63 AMG 4MATIC represents a new dimension in its segment when it comes to driving dynamics.

The S 63 AMG with rear-wheel drive features AMG sports suspension based on MAGIC BODY CONTROL. The new S-Class is the first car in the world able to recognise road surface undulations in advance. If ROAD SURFACE SCAN detects such undulations with the help of the stereo camera, MAGIC BODY CONTROL adjusts the suspension in advance to suit the situation. Both suspension modes - "Comfort" and "Sport" - are also available here. The AMG-specific elastokinematics ensure more directness when driving dynamically. Both suspension variants available for the S 63 AMG offer hallmark Mercedes comfort on long journeys.

The electromechanical AMG speed-sensitive sports steering with variable steering ratio is the perfect complement: this greatly enhances vehicle handling and agility while maintaining driving safety at high speeds. In "Comfort" suspension mode, the AMG speed-sensitive sports steering enhances comfort by providing more steering assistance. If the "Sport" suspension setting is selected, on the other hand, the driver feels a more sportily stiff level of steering assistance – which tends to result in better road feel.

The pre-programmed curves for power assistance enhance feedback and steering precision.

AMG light-alloy wheels based on systematic lightweight construction

For the first time, the S 63 AMG is available with AMG forged light-alloy wheels as standard. This design reduces weight while increasing strength – the result is lower unsprung masses, giving advantages in terms of handling and spring/damper element response. In the standard specification, the S 63 AMG is fitted with AMG multi-spoke forged light-alloy wheels painted in titanium grey with a high-sheen finish – front: 8.5 x 19, rear: 9.5 x 19, tyre sizes 255/45 R 19 and 285/40 R 19.

Optional extras include AMG forged light-alloy wheels in a 10-spoke design painted in titanium grey and polished, front: 8.5 x 20, rear: 9.5 x 20, tyre sizes 255/40 R 20 and 285/35 R 20. The AMG light-alloy wheels feature a high-quality, screwable and fully integrated wheel bolt cover made of forged aluminium. Its shape is reminiscent of a centre lock as seen in motorsport. The AMG logo is elegantly integrated into one of the ten spokes. As an option, these AMG light-alloy wheels are also available painted in matt black with a high-sheen rim flange. Alternatively, forged wheels of the same sizes in a 5-twin-spoke design painted in titanium grey with a high-sheen finish and a black wheel bolt cover are available.

AMG ceramic high-performance composite brake system as an option for the first time

Extremely short stopping distances and rapid deceleration are a given for any AMG high-performance car. And the new S 63 AMG is no exception as it is equipped with a weight-optimised, fade-resistant AMG high-performance composite brake system. An AMG ceramic high-performance composite brake system is available as an option for the S-Class for the first time. The more than 20 percent lighter design ensures lower unsprung masses as well as enhancing driving dynamics, agility and ride comfort. In addition to this, the system has a longer service life, is more resistant to corrosion and displays higher thermal stability. The AMG ceramic high-performance composite brake system has front brake discs with a diameter of 420 millimetres and is recognisable by the "AMG Carbon Ceramic" logo on the specially painted brake callipers.

Design: dynamism and exclusivity fused with sensuous forms

Powerful and exclusive, dynamic and prestigious – the new S 63 AMG also makes an impact in visual terms. The high-performance saloon's design is defined by the impressive blend of hallmark Mercedes sensual forms, classic architecture and a sleek silhouette with classic AMG design features. A large, upright and distinctly three-dimensional radiator grille underlines the special status of the S-Class – with an exciting contrast to this being provided by the front apron with its three large cooling air intakes. The front apron with grilles painted in high-gloss black displays the stylised "A" that is a hallmark of AMG vehicles, and emphasises the exclusivity and power of the S 63 AMG. Flics (air deflectors) in high-gloss black on the side air intakes optimise the flow of air to the cooling modules – a design that is a familiar sight in motorsport. The three-dimensional front splitter in silver chrome reduces lift.

Side sill panels with three-dimensional inserts in silver chrome make the vehicle appear closer to the road and create dynamism along the flanks with the "Dropping Line" that is so typical of the brand. Large light-alloy wheels are another trademark AMG feature: they afford a clear view of the AMG high-performance braking system. "V8 BITURBO" lettering in new, contemporary typography on the front wings identifies the top-of-the-range eight-cylinder model. This new lettering also appears in the "S 63 AMG" model designation on the boot lid. The design is drawn to a powerful conclusion by the black diffuser insert with trim in silver chrome and the two chromed twin tailpipes of the AMG sports exhaust system with exhaust flaps.

Interior: beguiling appointments, design and quality

Like the exterior design, the S 63 AMG interior is a beguiling combination of the sporty and exclusive atmosphere of a true AMG model, with classic Mercedes values such as improved interior dimensions, new control logic, new ergonomic touches, ease of use, safety, appeal and aesthetics. The newly developed AMG sports seats with electrical adjustment, Memory function and seat heating offer the driver and front passenger more lateral support. Fine nappa leather in AMG V8 design with AMG badges in the front seat backrests creates an exquisite and luxurious atmosphere on board. Special touches include the embossed emblem on the armrest of the front centre console and the high-quality analogue clock in an exclusive IWC design, which for the first

time features three-dimensional, milled metal hands and metal appliqués on the dial.

The AMG sports steering wheel with its distinctively contoured rim, perforated leather in the grip area and aluminium shift paddles allows perfect vehicle control. Another feature displaying the hallmark AMG look is the high-resolution TFT colour display as an AMG instrument cluster with two animated round dials: in addition to the AMG-specific lettering and the needles in red/silver, further distinctive design features include the AMG logo in the speedometer with 330 km/h scale (left) and the "V8 BITURBO" lettering in the rev counter (right).

The AMG main menu has a digital speedometer and a permanent gear display in the upper section. In transmission mode "M" the driver is also prompted to perform an upshift shortly before the rpm limit is reached. Selecting "Warm Up" in the AMG main menu brings up two further dials indicating the engine oil and transmission oil temperatures. The transmission and suspension configurations that can be set using the keys in the centre console, as well as the ESP® mode, are shown at the lower edge of the AMG "Set Up" menu. An animated S 63 AMG on the TFT display between the speedo and rev counter gives the driver visual feedback.

Further standard equipment for all S 63 AMG models (selection):

- AMG door sill panels
- AMG floor mats
- AMG sports pedals made from brushed stainless steel with rubber studs
- Ambience lighting
- ATTENTION ASSIST
- COLLISION PREVENTION ASSIST
- COMAND Online
- 10 loudspeakers with Frontbass
- Metallic paintwork
- Tyre pressure loss warning system
- LED High Performance headlamps

Numerous individualisation options are available from the AMG Performance Studio (selection):

- AMG Exterior Carbon-Fibre package
- AMG ceramic high-performance composite braking system (available from 03/2014)
- AMG carbon-fibre engine cover
- AMG Performance steering wheel in nappa leather / DINAMICA microfibre, black
- AMG trim in carbon fibre/black piano lacquer
- Brake callipers, painted red

Additional optional extras (selection):

- AIR-BALANCE package
- Burmester® Surround Sound System
- Burmester® High-End 3D Surround Sound System
- Business Telephony in the rear
- Chauffeur package
- designo appointments packages
- Executive seat
- Exclusive package
- First-Class rear
- Folding tables in the rear
- LED Intelligent Light System
- Climatised seats for the driver and front passenger, including heating and ventilation
- Seat Comfort package incl. ENERGIZING massage function
- Warmth Comfort package

The S 63 AMG likewise sets new standards in active and passive safety: what began with PRE-SAFE® ten years ago and continued with DISTRONIC PLUS is now leading to a new dimension in driving. Comfort and safety have blended into one. Mercedes-Benz calls this "Intelligent Drive". New systems make the new S-Class even more comfortable and safe:

- Driving Assistance package Plus
- Night View Assist Plus

World premiere and market launch in September 2013

The market introduction of the S 63 AMG begins in September 2013.
Prices for Germany (incl. 19% VAT):

S 63 AMG (short wheelbase):	€ 149,880.50
S 63 AMG 4MATIC (long wheelbase):	€ 152,617.50

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"Expertise in the high-end automotive segment"

"Following the successful launch of the A 45 AMG and the CLA 45 AMG, the new S 63 AMG highlights our expertise in the automotive high-end segment. Lightweight construction and absolute performance are among the key strengths of the new flagship model from Mercedes-AMG. The S 63 AMG likewise leads the way when it comes to perfection, high-class appeal and quality. We are also offering the S 63 AMG for the first time with the performance-oriented AMG all-wheel drive system 4MATIC."
Ola Källenius, CEO of Mercedes-AMG GmbH

"We have unquestionably achieved our aim of making the new S 63 AMG more powerful, lightweight and efficient than its predecessor. In terms of driving dynamics as well, the S 63 AMG has made giant leaps forward – not least thanks to the option of the performance-oriented AMG 4MATIC all-wheel drive."
Tobias Moers, Head of Overall Vehicle Engineering and Board Member of Mercedes-AMG GmbH

"The AMG 5.5-litre V8 biturbo engine of the S 63 AMG is not only the most powerful member of the BlueDIRECT engine family – in terms of maximum performance and fuel consumption our eight-cylinder power unit also continues to be the most efficient series-production V8 of all. With the combination of the AMG SPEEDSHIFT MCT 7-speed sports transmission and the optionally available, performance-oriented AMG 4MATIC all-wheel drive, the new S 63 AMG has an unrivalled powertrain."
Christian Enderle, Head of Powertrain Development, Mercedes-AMG GmbH

"Outstanding performance, an exquisite onboard atmosphere and all-wheel drive as an option for the first time: Especially with the S 63 AMG 4MATIC, we are addressing new markets and customers. The new AMG V8 flagship model in the S-Class is a unique package that has no equal in the competitive lineup."
Mario Spitzner, Head of Branding and Marketing, Mercedes-AMG GmbH

Engine			
Number of cylinders/arrangement		V8, 4 valves per cylinder	
Displacement	cc	5461	
Bore x stroke	mm	98.0 x 90.5	
Rated output	kW/hp	430/585 at 5500 rpm	
Rated torque	Nm	900 at 2250-3750 rpm	
Compression ratio		10.0 : 1	
Mixture formation		Microprocessor-controlled direct petrol injection, biturbo-charging	
Power transmission			
Drive system		Standard drive system	
Transmission		AMG SPEEDSHIFT MCT 7-speed sports transmission	
Gear ratios	Final-drive	2.65	
	ratio	4.38	
	1st gear	2.86	
	2nd gear	1.92	
	3rd gear	1.37	
	4th gear	1.00	
	5th gear	0.82	
	6th gear	0.73	
	7th gear	–3.42	
	Reverse		
Chassis and suspension			
Front axle		Four-link suspension, MAGIC BODY CONTROL active suspension system	
Rear axle		Multi-link independent suspension, MAGIC BODY CONTROL active suspension system	
Braking system		Composite disc brakes, ventilated and perforated all round, electric parking brake at the rear, ABS, Brake Assist, ESP®	
Steering		Electromechanical rack-and-pinion power steering	
Wheels		front: 8.5 J x 19; rear: 9.5 J x 19	
Tyres		front: 255/45 ZR 19; rear 285/40 ZR 19	
Dimensions and weights			
		Short wheelbase	Long wheelbase
Wheelbase	mm	3035	3165
Track, front/rear	mm	1630/1644	1630/1644
Overall length	mm	5157	5287
Overall width	mm	1915	1915
Overall height	mm	1501	1499
Turning circle	m	11.9	12.3
Boot capacity*	l	510	510
Kerb weight according to EC**	kg	1970	1995
Kerb weight according to EC***	kg	2045	2070
Payload (kerb weight acc. to EC)	kg	655	655
Perm. gross vehicle weight	kg	2700	2725
Tank capacity/incl. reserve of	l	70/10	70/10
Performance and fuel consumption			
		Short wheelbase	Long wheelbase
Acceleration 0-100 km/h	sec.	4.4	4.4
Top speed****	km/h	250	250
Fuel consumption, NEDC combined	l/100 km	10.1	10.1
CO_2 emissions	g/km	237	237
Efficiency class		E	E

*according to VDA measuring method; ** fuel tank 90% full, without driver and luggage; *** fuel tank 90% full, with driver (68 kg) and luggage (7 kg); **** electronically limited

Mercedes-Benz S 63 AMG 4MATIC

Engine		
Number of cylinders/arrangement		V8, 4 valves per cylinder
Displacement	cc	5461
Bore x stroke	mm	98.0 x 90.5
Rated output	kW/hp	430/585 at 5500 rpm
Rated torque	Nm	900 at 2250-3750 rpm
Compression ratio		10.0 : 1
Mixture formation		Microprocessor-controlled direct petrol injection, biturbo-charging
Power transmission		
Drive system		All-wheel drive
Transmission		AMG SPEEDSHIFT MCT 7-speed sports transmission
Gear ratios	Final-drive	2.65
	ratio	4.38
	1st gear	2.86
	2nd gear	1.92
	3rd gear	1.37
	4th gear	1.00
	5th gear	0.82
	6th gear	0.73
	7th gear	–3.42
	Reverse	
Chassis and suspension		
Front axle		Four-link suspension, anti-dive, full air suspension system with electronically controlled damping system AMG RIDE CONTROL, stabiliser
Rear axle		Multi-link independent suspension, anti-squat and anti-dive, full air suspension system with electronically controlled damping system AMG RIDE CONTROL, stabiliser
Braking system		Composite disc brakes, ventilated and perforated all round, electric parking brake at the rear, ABS, Brake Assist, ESP®
Steering		Electromechanical rack-and-pinion power steering
Wheels		front: 8.5 J x 19; rear: 9.5 J x 19
Tyres		front: 255/45 ZR 19; rear 285/40 ZR 19
Dimensions and weights		
Wheelbase	mm	3165
Track, front/rear	mm	1643/1644
Overall length	mm	5287
Overall width	mm	1915
Overall height	mm	1499
Turning circle	m	12.5
Boot capacity*	l	510
Kerb weight according to EC**	kg	1995
Kerb weight according to EC***	kg	2070
Payload (kerb weight acc. to EC)	kg	655
Perm. gross vehicle weight	kg	2725
Tank capacity/incl. reserve of	l	70/10
Performance and fuel consumption		
Acceleration 0-100 km/h	sec.	4.0
Top speed****	km/h	250
Fuel consumption, NEDC combined	l/100 km	10.3
CO_2 emissions	g/km	242
Efficiency class		F

*according to VDA measuring method; ** fuel tank 90% full, without driver and luggage; *** fuel tank 90% full, with driver (68 kg) and luggage (7 kg); **** electronically limited

Dynamism, efficiency and emotion

- **AMG 5.5-litre V8 biturbo engine rated at 430 kW (585 hp) and 900 Nm**
- **Unrivalled output and torque**
- **Most efficient eight-cylinder engine in series production**
- **Most powerful member of the BlueDIRECT engine family**
- **Compliance with the EU6 emissions standard right from market launch**

Efficiency and emotion, top performance and power delivery – in the second generation of the S 63 AMG, the AMG 5.5-litre V8 biturbo engine once again asserts its leadership in this competitive segment. This high-performance engine from Mercedes-AMG with the in-house designation M 157 outperforms all comparable engines: no other series-production eight-cylinder engine is able to match its output of **430 kW** (585 hp) and maximum torque of 900 newton metres. In terms of maximum output and fuel consumption, the AMG eight-cylinder engine from the BlueDIRECT family of engines remains the most efficient series-production V8 engine of all. Even though the engine output has been increased by **30 kW** (41 hp), the fuel consumption of the new S 63 AMG is up to 0.4 litres per 100 kilometres lower than that of the preceding model.

The performance figures show that dynamism and low fuel consumption can be perfectly combined. The S 63 AMG 4MATIC accelerates from standstill to 100 km/h in 4.0 seconds, the rear-wheel drive variant in 4.4 seconds. The top V8 model reaches its top speed of 250 km/h (electronically limited) effortlessly and serenely. The driving experience is characterised by the unrivalled power delivery of the charged eight-cylinder power unit from the AMG engine shop in Affalterbach: 900 newton metres of torque is on tap from 2250 to 3750 rpm – guaranteeing exhilarating pulling power in any speed range.

	S 63 AMG with AMG 5.5-litre V8 biturbo engine
Cylinder arrangement	V8
Cylinder angle	90°
Valves per cylinder	4
Displacement	5461 cc
Bore x stroke	98.0 x 90.5 mm
Cylinder spacing	106 mm
Compression ratio	10.0 : 1
Output	**430 kW** (585 hp) at 5500 rpm
Output per litre	78.7 kW (107.1 hp)
Max. torque	900 Nm at 2250 - 3750 rpm
Torque per litre	164.8 Nm
Maximum engine speed	6500 rpm
Engine weight (dry)	203 kg
Power/weight ratio	0.34 kg/hp
Fuel consumption **NEDC combined**	10.1 l/100 km 10.3 l/100 km*
CO_2 emissions	237 g/km 242 g/km*
Acceleration 0-100 km/h	4.0 s* 4.4 s
Top speed	250 km/h**

* Figures for S 63 AMG 4MATIC; ** electronically limited.

AMG sports exhaust system with automatic exhaust flaps

The engine's sound signature traditionally accounts for a high proportion of the emotional appeal when driving an AMG high-performance car – and the same applies to the S 63 AMG, which is equipped with an AMG sports exhaust system with exhaust flaps. In each rear silencer there is an exhaust flap which is operated automatically by characteristic mapping. For the first time the engine sound depends on the selected transmission mode: in mode "C" (Controlled Efficiency) the exhaust flaps remain closed in most driving situations, whereas

in "S" (Sport) and "M" (Manual) modes they open earlier and more spontaneously, especially if the driver prefers a dynamic driving style.

This differentiation resolves the conflict of aims between dynamic performance and hallmark Mercedes long-distance suitability: if the driver selects mode "C", the sound signature of the eight-cylinder biturbo engine remains discreet – the best possible solution for long distances and outstanding comfort in the rear, especially if the S 63 AMG is chauffeur-driven. In transmission modes "S" (Sport) and "M" (Manual), the driver hears the power residing in the eight-cylinder biturbo more distinctly: in this case the exhaust flaps open earlier and more immediately, the exhaust note from the two chromed twin tailpipes becomes more pronounced and emotional, in true AMG style. The engine starting sound is identical in all transmission modes, however in ECO start/stop mode the V8 has a more subdued starting sound than when started normally using the vehicle key.

Compliance with the EU6 emissions standard, which only comes into force in 2015

From the manifolds to the rear silencers, the uniformly twin-pipe exhaust system has a pipe diameter of 70 millimetres. A transition point between the two exhaust tracts helps to achieve the overall acoustic configuration. The isolating element behind the catalytic converters reduces body resonances and compensates for the elongation of the exhaust system. The layout involving a tandem catalytic converter box on each side is efficient and saves space: near the front firewall, two thin-walled ceramic substrates are grouped together in a housing on each side. This solution dispenses with the need for additional underfloor catalytic converters. The two ceramic substrates are different, in order to achieve rapid and effective treatment of the exhaust gases: the front substrate is coated with palladium, the rear with a bimetal layer of palladium and rhodium. A lambda sensor is located upstream of the catalytic converter box for each cylinder bank, and there is a diagnostic lambda sensor between each pair of thin-walled substrates.

The engineers at Mercedes-AMG GmbH have made major progress where exhaust emissions are concerned: optimisation of the injection timing with the help of multiple injections and adaptation of the European on-board diagnostic system has made it possible to comply with the particularly stringent EU6 emissions standard, which only comes into force in 2015. The AMG 5.5-litre

V8 biturbo engine is also ideally equipped to meet the second stage of the EU6 emissions legislation, due to come into force from 2017, which prescribes an even greater reduction in particulate emissions.

Other technical highlights of the AMG eight-cylinder engine include:

- Direct petrol injection
- Biturbocharging
- All-aluminium crankcase
- Four valves per cylinder with camshaft adjustment
- Air-to-water intercooler
- Alternator management
- ECO start/stop function

Two exhaust gas turbochargers located next to the cylinder banks supply the eight cylinders with fresh air. At their maximum speed of 185,000 rpm under full load, the two turbochargers force 1750 kg of air per hour into the combustion chambers. Thanks to their special, compact design – the turbine housings are welded to the exhaust manifold – there are not only significant space advantages, but the catalytic converters also heat up more rapidly.

The V8 dispenses with the blow-off valve that is normally used. This means that the compressor housing could be kept extremely compact in design. To ensure an agile, undelayed response from the engine, all the air ducting in the intake tract is as short as possible. The wastegate valve, which reduces pressure in the exhaust system under negative load changes, is actuated by an electropneumatic converter using vacuum pressure. This allows dethrottling in the partial-load range, which in turn reduces fuel consumption.

Efficient air-to-water intercooler

As was already the case in the AMG 6.0-litre V12 biturbo engine, the eight-cylinder direct-injection unit uses particularly efficient air/water intercooling. The low-temperature cooler with its water circuit is neatly accommodated within the V of the cylinder banks. It very effectively cools down the intake air compressed by the turbochargers before it enters the combustion chambers, and maintains a constantly lower intake temperature under full load. The large radiator at the car's front end ensures defined cooling of the water circulating in the low-temperature circuit. Extremely short charge-air ducting makes for

optimum responsiveness. The stainless-steel pressure pipes for the fresh and charge air are produced by the hydroforming process, have a wall thickness of only 0.8 millimetres and are designed for very low pressure loss.

All-aluminium crankcase with Silitec cylinder liners

The crankcase for the AMG 5.5-litre V8 biturbo engine is made completely of diecast aluminium. The low (dry) engine weight of 203 kilograms is the result of the uncompromising lightweight construction strategy AMG Lightweight Performance, and gives the vehicle balanced weight distribution. The bearing cover for the main crankshaft bearings, made of grey cast iron, is bolted to the crankcase for high rigidity. Cast-in Silitec cylinder liners ensure that the eight pistons operate with low friction.

Drilled ventilation holes in the crankcase lead to a higher output and fuel savings under partial load. Above the bearing blocks are longitudinally drilled holes, which interconnect the crankcase cavities. Normally the upward and downward movement of the pistons causes air to be forced into and extracted from the sump, which leads to increased resistance and thus to a reduction in engine output. The ventilation holes prevent this by ensuring effective pressure compensation between the cavities.

The forged crankshaft made of high-grade 38MnS6BY steel alloy (a combination of the chemical elements manganese, sulphur, boron and yttrium) rotates in five main bearings, has eight counterweights and has been optimised with respect to torsional rigidity, inertia, low rotating masses and a long operating life. A two-mass viscous damper mounted at the front reliably eliminates vibrations. Each connecting rod journal on the crankshaft carries two forged, cracked connecting rods. In the interests of low mechanical friction and high wear resistance, the eight lightweight pistons have a metallic contact surface. Pressure-controlled oil-spray nozzles in the crankcase ensure that the highly stressed piston crowns are efficiently cooled.

Four-valve technology with variable camshaft adjustment

Perfect charging of the combustion chambers is ensured by large intake and exhaust valves, of which there are two per cylinder. The exhaust valves, which are subject to high thermal loads, are sodium-cooled and hollow in order to reduce weight. Four overhead camshafts operate the 32 valves via low-

maintenance, low-friction cam followers. The infinitely variable camshaft adjustment within a range of 40 degrees on the intake and exhaust sides depends on the engine load and engine speed, leading to outstanding output and torque values. This also results in consistent idling at a low speed.

Depending on the engine speed, valve overlap can be varied for the best possible fuel/air supply to the combustion chambers and efficient removal of the exhaust gases. The variable camshaft adjustment is carried out electromagnetically via four pivoting actuators, and is controlled by the engine control unit. The camshafts are driven by three high-performance timing chains, which have considerable advantages with regard to noise comfort compared to cylinder roller chains.

Innovative oil supply and water cooling

An efficient oil supply under all load and operating conditions is ensured by the oil pump with an electrically controlled compression stage. The oil pressure can be varied between 2 and 4 bar, which has advantages for friction power and fuel economy. A suction stage integrated into the oil pump for the two turbochargers prevents oil entrainment into the charge air and exhaust gases, which further helps to reduce emissions. The oil capacity is 10.5 litres.

Another intelligent solution is the combined water/oil cooling system: After cold-starting, the engine oil is initially only cooled by the oil-water heat exchanger. If the cooling performance of the compact cooler is insufficient, an oil thermostat allows the flow to pass through the external engine oil air cooler as well. The advantage of this system is more rapid warming of the engine oil, as the coolant warms up more rapidly in the warm-up phase and the oil is later cooled by the coolant. A selectable coolant thermostat ensures rapid warming of the coolant when starting off and during the warm-up phase.

The engine coolant is cooled using the particularly efficient cross-flow principle. There is a transverse flow of coolant through both the crankcase and the cylinder heads. Additional cooling slots in the cylinder head allow more efficient cooling of the combustion chamber, which brings advantages during combustion by enabling earlier ignition timings to be chosen without incurring the risk of knocking.

Large apertures in the front apron of the S 63 AMG ensure an effective airflow to the coolant, engine oil, charge air and transmission oil coolers. Behind the large cooling module in the front section is a suction-type fan with an output of 1000 watts – this vents the warm air from the engine compartment as necessary. A separate slot above the front splitter directs fresh air to the AMG-specific engine oil cooler in the front. The additional water cooler mounted on the right wheel arch ensures operating safety even when driving very dynamically.

Alternator management and lightweight lithium-ion battery

The ECO start/stop function, which shuts down the eight-cylinder engine whenever the vehicle stops in "Controlled Efficiency" mode, is not the only feature to contribute to fuel efficiency. Efficiency is also aided by the alternator management system: whenever the V8 engine is on the overrun, and during braking, kinetic energy is not converted into heat but used to charge the battery. During steady driving or accelerating, a combination of on-board electrical system and alternator management enables the alternator to be kept at a low voltage level.

As in the SLS AMG Coupé *Black Series*, Mercedes-AMG uses a lithium-ion battery in the S 63 AMG. This replaces the conventional starter battery and has numerous advantages over a conventional battery concept: With a capacity of 78 Ah, the lithium-ion battery replaces both the starter battery and the backup battery – resulting in a weight saving of over 20 kilograms. The high-performance battery is relatively insensitive to cold temperatures and has compact dimensions. The S 63 AMG is the world's first volume produced vehicle with this type of battery concept.

Highly efficient engine electronics for every function

All the engine functions are executed and controlled by a particularly efficient control unit. This state-of-the-art engine computer not only controls direct petrol injection, charge pressure, camshaft adjustment and variable oil supply but also communicates with all the other onboard control units, such as that of the AMG SPEEDSHIFT MCT 7-speed sports transmission. The microprocessor has more than 30,000 different parameters and functions stored in its memory, and is able to perform up to 260 million individual operations per second. To reduce the load on the engine control unit, the eight individual ignition coils

have an integral electronic module on each cylinder. This ensures a strong ignition spark at all engine speeds and under all load conditions. The highly precise distribution of fuel by the piezo-electric injectors is handled by eight high-voltage output stages.

Engine production in the AMG hand-assembly shop

Like all AMG V8 and V12 engines, the eight-cylinder biturbo engine for the S 63 AMG is assembled by hand in the AMG engine shop in Affalterbach. Highly qualified engine technicians assemble the M 157 according to the "one man, one engine" philosophy. A matter of course: adherence to the strictest quality standards, confirmed by the AMG engine plate bearing the signature of the engine technician who assembled it. Apart from serving as an AMG hallmark confirming superlative production quality, this plate also attests to the peerless DNA of Mercedes-Benz's high-performance brand.

Performance brings obligations

- **Performance-oriented AMG 4MATIC all-wheel drive as an option**
- **Compact all-wheel drive entailing additional weight of only around 70 kilograms**
- **AMG SPEEDSHIFT MCT 7-speed sports transmission for a personal setup**
- **Standard-fit ECO start/stop function helps to save fuel**

Performance also brings obligations – as an AMG-exclusive feature, the S 63 AMG comes with the AMG SPEEDSHIFT 7-speed sports transmission and optionally with performance-oriented AMG 4MATIC all-wheel drive. For the top V8 model in the S-Class, the focus of the developers at Mercedes-AMG was once again on dynamic performance.

The technical basis for the performance-oriented AMG 4MATIC all-wheel drive system is a transfer case for the additional power take-off to the driven front axle. Unlike in the standard model, 33 percent of the engine torque is sent to the front axle and 67 percent to the rear axle. This rear-biased power distribution provides for the signature AMG high driving dynamics and superlative driving enjoyment. The transfer case requires no additional installation space, as it is integrated compactly into the AMG SPEEDSHIFT MCT 7-speed sports transmission. The torque is transmitted from the power take-off via a propeller shaft to the front axle. Power transmission from the front axle differential to the front-left drive shaft is effected via an intermediate shaft which passes through an encapsulated shaft duct in the engine oil pan. This compact design leads to an additional weight of only around 70 kilograms.

Enhanced driving safety on wet or wintry road surfaces

The AMG 4MATIC all-wheel drive improves road safety and grip on wet or wintry roads. Optimum traction is guaranteed by a multi-disc clutch with a locking effect of 50 Nm, which exploits the frictional connection potential of all four wheels to the full on snow and ice in particular. This basic concept allows high traction levels, because the dynamic axle load transfer to the rear axle that occurs during acceleration is used to apply more drive torque there.

Intervention by the electronic control systems ESP®, 4ETS or ASR can therefore occur as late as possible and the bulk of the drive torque is converted into tractive power, even on slippery roads. All the control intervention functions are performed virtually unnoticed, though the driver is informed immediately if they approach the critical limits. In this instance a yellow warning symbol flashes in the instrument cluster, clearly signalling that the driving style should be adapted in line with the road conditions.

Whether with optional all-wheel drive or rear-wheel drive, the S 63 AMG features wheel-selective braking intervention by ESP® Curve Dynamic Assist, in the interests of high agility. This prevents irritating understeer when turning into bends. During cornering, targeted braking intervention at the inside rear wheel helps the vehicle to corner with precision.

Exclusive AMG SPEEDSHIFT MCT 7-speed sports transmission

Seven gears, three modes and the ECO start/stop function: The AMG SPEEDSHIFT MCT 7-speed sports transmission combines huge emotional appeal and maximum driving pleasure with outstanding economy. The sports transmission is exclusive to Mercedes-AMG and combines the sporty, direct and agile responsiveness of a manual transmission with the maximum comfort of an automatic transmission. MCT stands for Multi-Clutch Technology and indicates that only clutch elements are employed to perform gearshifts. A compact wet start-up clutch, which runs in an oil bath, replaces the conventional torque converter. Thanks to its low rotational inertia, the transmission responds instantaneously and dynamically without the losses typical of a torque converter transmission – thereby helping to save fuel. The AMG sports transmission also impresses with its low weight of just 80 kilograms. This is made possible by the use of lightweight magnesium for the transmission housing. Vibrations are effectively eliminated by a new, two-stage torsional damper, with ensuing benefits in perceived passenger comfort.

ECO start/stop function as standard

The ECO start/stop function fitted as standard is permanently active in the comfort-oriented "Controlled Efficiency" ("C") driving mode. Once the driver comes to a halt, for example at a red traffic light or in a traffic tailback, the engine is automatically switched off. When the brake pedal is released or the accelerator is depressed, the engine is immediately restarted and the car is

able to move off again quickly. Intelligent technology guarantees a comfortable and immediate starting procedure: a crankshaft sensor which recognises the direction of rotation registers the rest position of all eight pistons. For an automatic engine start, the cylinder with the most favourable piston position receives an injection of fuel into its combustion chamber. This is helped by the precise piezo-electric injectors, as they make particularly fast starts possible.

The engine control unit ensures that the engine is only switched off if certain preconditions are met. The starter battery must have sufficient charge, for example, and the engine must be at the necessary operating temperature for efficient emission control. The same applies to the interior temperature selected by the driver: if this has not yet been reached, the engine is not switched off when the car comes to a stop. The electrical management system ensures that active audio, telephone or video functions are not interrupted by the start/stop function.

A green "ECO" symbol shows the driver when the start/stop function is active. Should one of the above criteria prevent use of the system, this is shown by a yellow "ECO" symbol in the central display. The start/stop function is deactivated in the dynamically oriented transmission modes "S" (Sport) and "M" (Manual).

Fuel-efficient Controlled Efficiency ("C") transmission mode

In adapting the MCT sports transmission to the AMG 5.5-litre V8 biturbo engine, the AMG engineers paid special attention to the new driving mode Controlled Efficiency ("C"). The emphasis was on keeping engine speeds as low as possible, in the highest possible gear, in any driving situation. When moving off in "C", the transmission always selects second gear and shifts markedly early to the next-highest gears if the driving style permits. At 60 km/h for instance, sixth gear will already be engaged – improving not only fuel consumption but also noise levels. Thanks to its powerful, readily available torque even at low engine speeds, the AMG V8 biturbo unit is absolutely ideal for this style of driving. Controlled Efficiency also means comfortable gearshifts and a "soft" accelerator response setup for outstandingly smooth power transfer.

Transmission modes "S" and "M" for added driving pleasure and dynamism

Apart from Controlled Efficiency ("C") there are two transmission modes available that appeal to the dynamically oriented driver: Sport ("S") and Manual ("M"). In transmission mode "S", both the engine and transmission respond with much more agility. Accelerator movements are more directly translated into drive power, and to this end the downshifts are faster. The gears are used to a higher rpm and, at 150 milliseconds, the gearshifts in "S" are 50 percent faster than in "C". If the "C/S/M" key is pressed again, transmission mode "M" is selected. In this mode the shift times are just 100 milliseconds.

The engine control unit also partially suppresses cylinders in "S" and "M" modes: precisely interrupting ignition and injection under full load for brief periods leads to even faster gearshifts than before. An appealing side effect of this lightning-fast process is a highly emotional sound in response to every gearshift with wide-open throttle. Another strength of the AMG SPEEDSHIFT MCT 7-speed sports transmission is the way in which it allows fast and spontaneous multiple downshifts. Using kickdown it is for example possible to downshift directly from seventh to fourth gear, or from fifth to second.

No automatic downshifts in manual "M" mode

In manual "M" mode the driver also benefits from the high torque of the V8 biturbo engine, as there is no automatic downshift under full load and kickdown; the transmission remains steadfastly in the selected gear. Moreover, the 7-speed sports transmission does not perform an automatic upshift in manual mode when the rev limit is reached. In "M" mode the AMG instrument cluster displays the current gear and provides the driver with a visual warning of the need for an upshift just before the needle reaches the red zone. This means that a particularly sporty driver can use the superior performance potential to its fullest extent. When approaching the lower rev limit, for example when braking the vehicle, there is an automatic downshift to the next lower gear.

The powerful electronic transmission control unit with integrated 200 MHz clock frequency processor controls spontaneous downshifts – for instance if the driver suddenly needs power for dynamic acceleration.

Serene driving pleasure

- **AMG RIDE CONTROL sports suspension with dedicated axles**
- **AIRMATIC air suspension in conjunction with all-wheel drive**
- **MAGIC BODY CONTROL combined with rear-wheel drive**
- **Hallmark AMG driving dynamics and a high level of long-distance comfort**
- **AMG speed-sensitive sports steering with variable steering ratio**
- **AMG forged light-alloy wheels as standard**
- **Optional AMG high-performance ceramic composite brake system**

Whether for the front or rear suspension – the developers at Mercedes-AMG adopted the basic layout of the standard S-Class for the S 63 AMG. Numerous components of the four-link front suspension and the multi-link independent rear suspension were however newly developed with the focus on hallmark AMG performance. There is a choice of two different suspension variants: Customers opting for the S 63 AMG 4MATIC with performance-oriented AMG 4MATIC all-wheel drive receive the AMG sports suspension with AIRMATIC. The rear-wheel drive variant has the AMG sports suspension based on MAGIC BODY CONTROL.

A new dimension of driving dynamics in this segment

Special kinematics were developed exclusively for the four-link front suspension of the S 63 AMG 4MATIC.The larger negative wheel camber, together with the larger rear axle stabiliser and the more rigid suspension subframe carrier at the rear axle, leads to greater agility when the driving style is dynamic. The result is that thanks to more direct feedback, a further improvement in grip and highly neutral behaviour at the physical limits, the S 63 AMG 4MATIC opens up a new dimension of dynamic driving in its segment.

The full air suspension system AIRMATIC is equipped with the Adaptive Damping System ADS PLUS. This fully automatic, electronically controlled system adjusts the damping at each wheel to the current requirements. As before, the single-tube dampers have two valves for the rebound and compression stages. Continuously adjustable damping is a new feature:

on the basis of numerous data such as acceleration, vehicle level or road speed, it allows better adaptation to the vehicle status and road surface condition to be achieved.

In the centre console to the left of the COMAND controller is a control key that enables the driver to select a personal suspension setup. As an alternative to the comfort-oriented basic setup "Comfort" with a sensitive response and soft damping characteristics, a more sporty setting is available. In "Sport" mode the shock absorbers have a 40 percent stiffer response on average, resulting in reduced body movements when driving dynamically. The selected mode is shown both by the lights on the key and in the AMG menu: After the lettering "AMG RIDE CONTROL sport" or "AMG RIDE CONTROL comfort", an animated S 63 AMG appears with a raised or lowered suspension.

Depending on the driving situation, speed and load condition, the system also automatically and very rapidly varies the damper characteristics and reduces the body roll angle in "Comfort" mode. For the driver this means continuous adaptation between the greatest possible agility and maximum ride comfort.

Thanks to continuous adaptation of the vehicle level, the AMG sports suspension based on AIRMATIC allows the suspension travel to be maintained under any load conditions. The suspension level is automatically adjusted depending on the road speed, and lowered by ten millimetres at speeds over 120 km/h in suspension mode "Comfort". Aerodynamic drag is reduced, and handling stability is improved by the car's low centre of gravity. If suspension mode "Sport" is selected manually, the suspension is likewise lowered by ten millimetres – also at speeds below 120 km/h. The driver is also able to select a suspension settting raised by 30 millimetres, for example on poor road surfaces or when negotiating a driveway. When a speed of 80 km/h is exceeded the suspension is automatically lowered after driving for three minutes, and immediately when it reaches 120 km/h.

MAGIC BODY CONTROL: Comfort and driving dynamics

The S 63 AMG with rear-wheel drive is equipped with the AMG sports suspension based on MAGIC BODY CONTROL as standard, including Active Body Control (ABC) and the innovative new ROAD SURFACE SCAN function. In the interests of improved feedback from the road and greater directness when driving dynamically, the S 63 AMG has AMG-specific elastokinematics.

Available choices: suspension mode "Comfort" or "Sport"

Like the AIRMATIC air suspension system, the active ABC suspension allows the driver a personal suspension setup. There is a choice between suspension mode "Comfort" and the 40 percent tauter "Sport" mode. Pressing the ABC key to the left of the COMAND controller causes the selected mode to appear in the AMG menu display: "AMG RIDE CONTROL sport" or "AMG RIDE CONTROL comfort" is shown depending on the selection. As additional information, an animated S 63 AMG with a raised or lowered suspension appears in the display.

In the case of the MAGIC BODY CONTROL suspension, the suspension level also remains constant irrespective of the load condition. In "Comfort" mode the suspension is lowered by ten millimetres between 120 and 160 km/h, and in "Sport" mode it is already lowered between 65 km/h and 100 km/h. With MAGIC BODY CONTROL, too, a raised suspension level is available at the touch of a button.

The world's first car with "eyes", thanks to ROAD SURFACE SCAN

The new S-Class is the first car in the world able to recognise road surface undulations in advance. The "eyes" for the ROAD SURFACE SCAN function are provided by a stereo camera fitted behind the windscreen, which scans the road up to 15 metres ahead of the vehicle and delivers a precise image of the road contours. Based on the camera pictures and driving status information, the control unit constantly calculates the best control strategy for overcoming unevenness such as prolonged bumps.

This means that in advance, and for each individual wheel, the vehicle is able to select stiffer or softer damper settings and use the active hydraulics to vary the load at each wheel. The suspension is adapted to the relevant situation within fractions of a second, enabling body movements to be considerably reduced. The result is unprecedented ride comfort. As ROAD SURFACE SCAN is camera-based, it works in the daytime, in good visibility, with suitable surface structures and at speeds up to 130 km/h.

In the Active Body Control system from Mercedes-Benz, the four spring struts are equipped with hydraulic cylinders (plungers) to adjust the force in each spring strut individually. This means that the system can almost completely

compensate for lifting, rolling and pitching movements of the body. The control unit receives information on the current driving situation from various acceleration sensors and then compares these data with those from the pressure sensors in the spring struts and the level sensors on the control arms. The system then computes the control signals for the servo-hydraulic valves at the front and rear axle to ensure precisely metered oil flows.

Once oil flows into the plunger cylinders, this modifies the tracing point of the steel springs integrated into the spring struts, generating the necessary force to counteract the body movements. Thanks to a constantly available hydraulic pressure of up to 200 bar, ABC is able to stabilise the body within fractions of a second.

ABC has undergone major modifications for the new S-Class: the wheel damping is now continuously adjustable, the spring strut response has been improved and the pump efficiency has been further enhanced. A digital interface connects the control unit and the sensors, while the fast FlexRay bus connects the control unit and the vehicle electronics. Processing power is more than double that of the previous system.

Electromechanical AMG speed-sensitive sports steering

A major part of the serene and sporty driving impression of the S 63 AMG is also due to the electromechanical AMG speed-sensitive sports steering. This is a Direct-Steer system, which means that the steering becomes noticeably more direct as a function of the steering angle. This significantly improves vehicle handling and agility. At the same time the dampened response from the centred position ensures the necessary handling safety at high speeds. In addition the AMG speed-sensitive sports steering adapts to the personal driving style and the chosen suspension mode: Drivers who select "Comfort" mode feel a higher level of servo assistance. In "Sport" the servo assistance is reduced, with a more sporty and taut setup. The driver benefits from what tends to be better road feedback.

In the electromechanical AMG speed-sensitive sports steering system the steering gear and the supporting servo-motor form a single compact unit and are mounted as previously on an extremely rigid and low-weight integral support frame made of high-strength steel which is positioned in front of the wheel's centre line. The high-performance control unit processes the parameters

captured by the ESP® control unit – including vehicle speed, steering angle, steering angle speed, lateral acceleration and also understeer/oversteer characteristics – and in a split second calculates the forces which the driver needs to input into the steering in different driving situations – from parking to high-speed motorway driving. Active steering dampers enhance the feeling of safety when driving straight ahead at high speed.

The steering assistance function is able to help stabilise the vehicle. An assisting steering torque level is determined depending on the vehicle status, then applied by the electric servo assistance. The driver is always able to override the steering assistance function, which only gives an indication of the steering direction that will best stabilise the vehicle.

If the vehicle is braked on a road surface with different friction (µ-split) on the left and right, this generates a yawing impulse which turns the vehicle in the direction of the high friction. The steering assistance system prompts the driver to turn the steering wheel in the appropriate direction to compensate for the yaw caused by the different friction.

Weight-optimised AMG light-alloy wheels produced by a forging process

Reduced weight with increased strength is one of the attributes of the forged AMG light-alloy wheels that are fitted as standard for all variants of the S 63 AMG. The weight advantage over conventional light-alloy wheels ensures a reduction in unsprung masses: this produces advantages in terms of handling and of the responsiveness of the spring/damper elements. In standard specification, the S 63 AMG is fitted with AMG light-alloy wheels painted in titanium grey with a high-sheen finish – front: 8.5 x 19, rear: 9.5 x 19, tyre sizes 255/45 R 19 and 285/40 R 19.

Optional extras include AMG forged light-alloy wheels in a 10-spoke design painted in titanium grey and polished, front: 8.5 x 20, rear: 9.5 x 20, tyre sizes 255/40 R 20 and 285/35 R 20. As particularly high-grade details, the wheels have the AMG logo integrated into one of the ten spokes and a high-quality, screwable and fully integrated wheel bolt cover in forged metal. Its shape is reminiscent of the centre lock commonly seen in motorsports. As an option, these AMG light-alloy wheels are also available painted in matt black with a high-sheen rim flange . As an attractive design alternative, AMG 5-twin-spoke

light-alloy wheels painted in titanium grey with a high-sheen finish and a black wheel bolt cover are available for the S 63 AMG.

Optional: AMG ceramic high-performance composite braking system

The braking system of an AMG high-performance car needs to meet extremely high expectations: fast deceleration, a precise actuation point and the shortest possible braking distances are a matter of course, as is fade resistance.

The weight-optimised AMG high-performance composite braking system developed exclusively for the S 63 AMG features perforated and ventilated brake discs in size 390 x 36 millimetres (front) and 360 x 26 millimetres (rear) all-round. One major development focus was on reducing brake-judder: the brake discs have a floating connection with the brake disc bowl by means of cast-in retaining arms, significantly reducing the typical "brake-judder" under extreme stresses and heat. Grey brake callipers with the AMG logo are standard, red-painted brake callipers are available on request.

Alternatively, and as a first for the S-Class from AMG, an even more efficient AMG high-performance ceramic composite braking system is available – this is recognisable by the specially painted brake callipers with the "AMG Carbon Ceramic" logo. Thanks to the material and production technology used, whereby the discs are produced from carbon-fibre reinforced ceramics in a vacuum at over 1700 degrees Celsius, the ceramic discs exhibit a much higher degree of hardness. This not only increases their operating life by many times compared to cast-iron discs, but also their resistance to extreme stresses and heat. The result is even greater stability even under extreme operating conditions. The even larger ceramic discs – front: 420 x 40 millimetres, rear: 360 x 32 millimetres – are of composite construction all-round, with a radial, free-floating connection to an aluminium bowl.

The ceramic brake discs are more than 20 percent lighter overall than conventional composite brake discs. The further reduction in unsprung masses not only improves driving dynamics and responsiveness, but also the response characteristics of the steering and the sensitivity of the suspension. The AMG high-performance ceramic composite braking system is available exclusively for the S 63 AMG 4MATIC as an optional extra.

Brake data at a glance:

	AMG high-performance composite braking system	**AMG ceramic high-performance composite braking system**
Front axle:		
Brake calliper	6-piston aluminium fixed calliper	6-piston aluminium fixed calliper
Brake disc	Composite technology, ventilated, perforated	Ceramic composite technology, ventilated, perforated
Diameter	390 mm	420 mm
Thickness	36 mm	40 mm
Weight*	16.4 kg	8.8 kg
Rear axle:		
Brake calliper	1-piston combined floating brake calliper	1-piston combined floating brake calliper
Brake disc	Composite technology, ventilated, perforated	Ceramic composite technology, ventilated, perforated
Diameter	360 mm	360 mm
Thickness	26 mm	32 mm
Weight*	8.5 kg	5.5 kg

*Weight of the brake disc

The S 63 AMG is equipped with an electric parking brake as standard. A combined floating brake calliper with an electric parking brake function is used at the rear axle. With the ADAPTIVE BRAKE, the S-Class offers a wealth of assistance functions. One example of these is the practical HOLD function: after braking to a standstill, briefly pressing the brake pedal a little further is all that is required to activate this function. The car is then held by the brakes, even if the driver's foot is taken off the brake pedal. The HOLD function is deactivated automatically when the car moves off.

If the driver's foot moves abruptly from the accelerator to the brake pedal before an emergency stop, the brake system increases the pressure in the brake lines and brings the pads into contact with the brake discs so that maximum braking power is available as soon as the driver hits the brake pedal. This priming of the brakes allows the system to assist the standard-fit Brake Assist system.

ADAPTIVE BRAKE also brings safety benefits in the wet: the system briefly applies the brakes at regular intervals to wipe the film of water from the brake discs and ensure that the brakes are able to perform at their peak. The finely metered brake pulses are imperceptible to the driver. This automatic brake drying function is always activated when the windscreen wipers have been operating for a certain length of time. Finally, ADAPTIVE BRAKE assists the driver when starting on an uphill slope. When the sensors detect that the car has stopped on an uphill slope, Hill Start Assist is activated automatically, briefly holding the brake pressure at a constant level so as to prevent the car from rolling backwards.

Dynamism, exclusivity and sensuous forms

- **"Driving Performance" also in the exterior design**
- **Luxurious ambience and sporty functionality**
- **Extensive range of high-quality standard equipment**
- **Highly attractive optional features from the AMG Performance Studio**

Status and dynamism, performance and elegance, exclusivity and superiority – the S 63 AMG visually confirms it special status within the model portfolio, and also embodies "Driving Performance" with its exterior design. The eight-cylinder top model from Affalterbach unmistakably and instantly announces: here comes an AMG. The overall impression is created by a combination of the sensuous lines that are a hallmark of Mercedes, classic architecture and a flowing silhouette with typical AMG design features.

The S-Class radiator grille is larger than before, upright and decidedly three-dimensional in design. The four louvres are tapered towards the outside, and do not contact the chrome frame. The front apron of the AMG bodystyling package stands in dramatic contrast to the dignified radiator grille. The large cooling apertures are not only reminiscent of motorsport, but also ensure an efficient airflow to the cooling modules located behind them. The high-gloss black flics (air deflectors) located at the side apertures assist this process, as does the slot above the front splitter: This specifically directs the cooling air towards the separate engine oil cooler. In addition the three-dimensionally formed front splitter in silver chrome reduces lift at the front axle.

The designers at Mercedes-AMG have supplemented the flowing, arched roofline and the sporty, coupé-like side line with the "Dropping Line" that is a hallmark of the brand with striking side sill panels: Three-dimensionally formed inserts in silver chrome make the car appear closer to the road, and add drama to the flank. Large light-alloy wheels are another typical feature of an AMG high-performance car: whether in the 10-spoke or 5-twin-spoke design, the AMG forged wheels allow a clear view of the large AMG high-performance braking system. Standing almost flush with the wheel arches, the AMG light-alloy wheels further enhance the impression of dynamism. Exclusively reserved for the S 63 AMG, the "V8 BITURBO" lettering on the front wings is in a new typography.

The same typography is found in the S 63 AMG model badge on the boot lid. Horizontal lines emphasise the width of the vehicle, as does the high-gloss black diffuser insert with a trim strip in silver chrome. Sheer power is suggested by the two chromed twin tailpipes of the AMG sports exhaust system with exhaust flaps.

Interior with luxurious ambience and sporty functionality

A feel-good atmosphere combined with a luxurious ambience and the sporty functionality of a genuine AMG high-performance model – that is how the interior of the S 63 AMG might best be described. A pleasure for all the senses: the lovingly designed interior fascinates with its very high-grade materials, first-class quality and carefully chosen colour schemes. All the occupants benefit from improved interior dimensions, a new control logic and new highlights in terms of ergonomics, operating convenience and safety.

AMG sports seats developed exclusively for the S 63 AMG ensure outstanding long-distance comfort. Electric adjustment, a memory function and seat heating are standard features. Newly contoured seat cushions and backrests improve lateral support when cornering at speed. Fine nappa leather in AMG V8 design with AMG badges in the front seat backrests creates an exquisite and luxurious atmosphere on board. This is perfectly complemented by a high-quality, embossed AMG emblem on the front centre console. There is a choice of four colours for the S 63 AMG: black, satin beige/espresso brown, crystal grey/seashell grey and nut brown/black. The standard wood trim can be replaced by two different designo trim variants – myrtle wood in high-gloss sunburst brown or metallised ash wood. Trim in AMG carbon-fibre/black piano lacquer is available from the AMG Performance Studio.

Another feature reserved for AMG is the high-quality analogue clock in an exclusive IWC design between the air vents: this for the first time features three-dimensional, milled metal hands and metal appliqués on the dial. The AMG sports steering wheel in nappa leather with a heavily contoured rim, an insert with AMG lettering, perforated leather in the grip area and aluminium shift paddles allows perfect vehicle control.

The AMG instrument cluster is in a decidedly sporty design: the animated dial instruments are dominated by the colours silver and red, while other AMG-specific features include the distinctive typography, the 330 km/h speedometer

scale with AMG logo and the "V8 BITURBO" lettering in the rev counter. The attention to detail is also obvious here: the AMG logo and V8 BITURBO lettering change their size and appearance depending on the operating state of the vehicle. The AMG start-up display is in keeping with this: when the driver's door is opened, an animated AMG logo appears in the large TFT display on the right.

Comprehensive information for the driver is provided by the AMG main menu integrated into the AMG instrument cluster: there is a digital speedometer and a permanent gear display in the upper section. In transmission mode "M" the driver is also prompted to perform an upshift shortly before the rpm limit is reached. Selecting "Warm Up" brings up two further dials indicating the engine oil and transmission oil temperatures. The transmission and suspension configurations that can be set using the keys in the centre console, as well as the ESP® mode, are shown at the lower edge of the AMG "Set Up" menu. An animated S 63 AMG in the TFT display between the speedometer and rev counter provides the driver with visual feedback: in transmission mode "C" (Controlled Efficiency), the car is seen standing on a normal country road, in mode "S" (Sport) it is on a winding road and in "M" (Manual) the background is a racetrack with red/white kerbs. The upper section of the display contains a permanent gear indicator and, when manual transmission mode "M" is selected, also an upshift recommendation. The activated transmission programme, current ESP® mode and selected suspension configuration can be seen at the lower edge.

Further standard equipment for all S 63 AMG models (selection):

- AMG door sill panels in stainless steel, front and rear
- AMG velour floor mats with embroidered AMG lettering
- AMG sports pedals made from brushed stainless steel with rubber studs
- Ambience lighting
- ATTENTION ASSIST
- COLLISION PREVENTION ASSIST
- COMAND Online
- Driving Assistance package Plus incl. Active Lane Keeping Assist, Active Blind Spot Assist, BAS PLUS with Cross-Traffic Assist, DISTRONIC PLUS with Steer Assist and Stop&Go Pilot, PRE-SAFE® Brake and PRE-SAFE® PLUS (standard for S 63 AMG; optional for S 63 AMG 4MATIC)
- 10 loudspeakers with Frontbass

- Metallic paintwork
- Tyre pressure loss warning system
- LED high-performance headlamps

Further enhancement with the Exclusive package

Customers choosing the optional Exclusive package receive an even higher-grade upholstery in Exclusive nappa leather with a design layout in an exclusive diamond pattern. This includes AMG badges in the front and rear seat backrests, colour-contrasted topstitching, an embossed AMG emblem on the rear centre armrest, designo sun visors and designo headlining in DINAMICA microfibre. The delineated perforations in the leather upholstery of the AMG sports seats are a special feature: there are intentionally no perforations in the nappa leather wherever there is contrasting topstitching. The result is extraordinarily neat seams and an unrivalled impression of quality. Other features in the Exclusive package include the leather-lined dashboard and door centre panels in a diamond-pattern design, leather-clad roof grab handles, additional wood trim and AMG door sill panels illuminated in white. Customers ordering Exclusive nappa leather upholstery are able to choose between black, satin beige/espresso brown, nut brown/black and porcelain/black.

Optional features from the AMG Performance Studio

Exclusive optional features with a decidedly sporty touch are available from the AMG Performance Studio. Options for the S 63 AMG are:

- AMG Exterior Carbon-Fibre package (cross-strut in the front apron, exterior mirror housings, inserts in the rear apron and side sill panels in carbon fibre)
- AMG Exclusive floor mats with AMG badge
- AMG door sill panels with AMG lettering illuminated in white
- AMG ceramic high-performance composite braking system
- AMG forged wheels in a 5-twin-spoke design painted in titanium grey with a high-sheen finish, with black wheel bolt cover, front: 255/40 R 20 on 8.5 x 20, rear: 285/35 R 20 on 9.5 x 20
- AMG forged wheels in a 10-spoke design painted in titanium grey and polished, with fully integrated wheel bolt cover, front: 255/40 R 20 on 8.5 x 20, rear: 285/35 R 20 on 9.5 x 20.

- AMG forged wheels in a 10-spoke design painted in matt black with high-sheen rim flange, with fully integrated wheel bolt cover,
  front: 255/40 R 20 on 8.5 x 20, rear: 285/35 R 20 on 9.5 x 20.
- AMG carbon-fibre engine cover
- AMG Performance steering wheel in black nappa leather/black DINAMICA microfibre
- AMG trim in carbon fibre/black piano lacquer
- Brake callipers, painted red
- Vehicle collection at the AMG Customer Center in Affalterbach
- Fuel tank with 80-litre capacity

Additional optional extras (selection):

- AIR-BALANCE package
- Burmester® Surround Sound system
- Burmester® High-End 3D Surround Sound system
- Business Telephony in the rear
- Chauffeur package
- designo appointments packages
- Executive seat
- Exclusive package
- First-Class rear
- Folding tables in the rear
- LED Intelligent Light System
- Seat Comfort package incl. ENERGIZING massage function
- Warmth Comfort package

Communication centre and concert hall

- **Unique Frontbass system as standard**
- **COMAND Online with WLAN HotSpot**
- **Individual Entertainment in the rear**
- **Two different Burmester® Surround Sound systems**

A completely new multimedia generation with intuitive operation and almost tangible functions thanks to visualisation and animations celebrates its debut in the new S-Class. Other innovations include the multi-user system, which allows independent access to the media sources of the entertainment system from any seat. The new S-Class is also the first saloon car to be equipped with the unique Frontbass system as standard. With this system, the interior space in the bodyshell's cross-members and side members is used as a resonance chamber for the woofers. A High-End 3D surround sound system is available on request.

Several hundred developers worldwide contributed to the new Mercedes-Benz multimedia generation, compiling more than 30 million lines of programming. The centrepiece of the new COMAND Online system is the Intel Atom, a processor whose performance fully equals that of components in the latest laptops.

As a completely new feature, the developers have made the individual functions of the communication systems almost tangible on the screens by means of visualisation and animations. The user is also able to adapt the content of the central display to personal preferences. With the exception of the navigation map (which always fills the complete display area), the graphic content of the central display is divided into a main area (2/3 on the right side of the display) and a supplementary area (1/3 on the left side of the display). In standard configuration the supplementary area shows additional information about the selected main application, e.g. the artist and song title when the radio function is active, or the current station when the TV is active.

It is also possible to show preferred content permanently in the supplementary area (except when the full navigation map is active). It is possible to select a

small navigation map, fuel consumption display, data connection display or entertainment information, for example.

In addition to this improvement in operating convenience, numerous new functions extend the multimedia options available, and transform the S-Class into a communication centre or a concert hall as required.

The interactive presentation of content is a major new feature of the **navigation function**. The new navitainment functions include an animated compass, the "DriveShow" for passenger information as in an aircraft, and the display of Google Maps on the head unit and in the rear. Information on the traffic situation is shown with hatched lines (rather than with vehicle silhouettes as before). Thanks to real-time traffic information, the navigation system is also better informed about the situation on the roads. Traffic data are now provided by the "Live Traffic Information" service. Unlike the previous data sources TMC and TMCpro, whose data are received by radio, "Live Traffic Information" uses a fast internet connection and is therefore particularly up-to-date.

As another new feature, a key word search can be used to enter destinations: only a few letters need to be entered, and the system will automatically display a choice of appropriate town/street combinations and possible points of interest. The letter combinations or key words can even contain spelling mistakes.

Example: if the driver enters STUT and BAD, the system will suggest 'Stuttgarter Strasse' in Bad Friedrichshall, 'Badstrasse' in Stuttgart and the 'Freibad Möhringen' swimming pool in Stuttgart. The entered key words are visually highlighted in the display of search results.

In the **radio function** the favourite stations can now be saved to an individually organised preset list for all wavebands (DAB, FM, AM) rather than to a general autostore function. Individual stations can then be called up using the favourites function. The "Song tagging" function is likewise useful: songs just played in the vehicle can be flagged and then downloaded to a mobile device via iTunes and the internet connection.

The **player** is now also able to recognise mixed tracks, i.e. video and audio files. Videos are shown as a preview in a small, animated area, and can be

enlarged to full-screen format. The function "Play similar titles" suggests songs similar to the one currently playing, accessing the CD, Music Register or a connected source. Also new are the Coverflow display, the album cover search and the Picture Viewer as a slideshow.

As a standard feature COMAND Online includes **"Bluetooth® Connectivity"**. This supports in-vehicle connection of a mobile phone using a standardised Bluetooth® interface. The optional **"Comfort Telephony"** is available as pre-installation of a universal telephone interface which allows the mobile phone to be connected to a phone cradle in the centre console. A suitable phone cradle for various mobile phone models is obtainable from Mercedes-Benz Accessories.

"Business telephony in the rear" with a hands-free function is optionally available for passengers in the rear. Connection of the mobile phone to the rear unit is likewise via Bluetooth®. Pre-installation with a universal phone interface is also possible for the rear. The telephony via the COMAND Online system is networked with the **"Business telephony in the rear"**. The enables conversations to be conveniently transferred between the driver and the rear passengers, and functions such as call-switching or conferencing are available. The business telephony is operated by a Bluetooth® handset integrated into the rear, which features a convenient touch-display. This means that functions such as seat adjustments can be intuitively controlled.

System	Functions
COMAND Online	• WLAN HotSpot integrated into the head unit as standard • Unrestricted internet browsing • SMS/email read/write function • Mercedes-Benz services (e.g. Google search, weather, Facebook, news) • Internet radio
Navigation	• Navitainment (DriveShow, Google Maps, StreetView) • Map showing the entire globe possible • Travel guide and personal POIs • Display of satellite images • Optimised 3D navigation with topographical model, photorealistic buildings and map rotation • Optimised search engine and destination input • Compilation of four alternative routes • Download of predefined destinations and routes • Live Traffic Information
Radio	• Song tagging – flagging of played songs and download via iTunes • Convenient editing/sorting of the station list • Station search by station name
Player	• Coverflow display and search by album cover • Two USB connectors • Optional Media Interface integrated into the head unit to support mobile devices • Bluetooth® Audio – wireless music from mobile devices • Optimised media search engine • "Play similar titles" • Reproduction of further audio/video formats • Display of title information from an internal database and via the internet (Gracenote) • PictureViewer via SD card/USB
Phone	• Simple Pairing Assist for easy telephone connection via Bluetooth® • Display of photos stored in the address book possible when a call comes in • Simultaneous connection of two telephones via Bluetooth® is possible (1st telephone to COMAND Online, 2nd to the rear unit) • Telephone operation by COMAND Online and in the rear if only one phone in the car is connected • Display of images matching callers, separately stored via COMAND Online • Placing of telephone calls from other applications (e.g. web browser) • Control of several telephone calls by call waiting and conference function • Convenient Bluetooth® handset with touch operation and remote control if rear telephony is specified • Operation of the system via smartphone/WLAN

The new S-Class is the first vehicle worldwide to offer a genuine multi-user system with **Individual Entertainment system in the rear**. This means that there is independent access to all entertainment system sources from any of the four seats – radio, TV, internet, navigation, DVD player and devices connected by USB.

The driver control function for all the seats is another new feature. The driver is able to route any audio or video source to the display and headset of any passenger. At the touch of a button the driver is also able to have one of the audio sources in use played via the onboard loudspeakers.

The multi-user system was technically realised by connecting the COMAND Online system with Individual Entertainment system in the rear via a fibre-optic cable, a so-called MOST bus system (Media Oriented Systems Transport). Access to the sources from any seat is possible via the MOST ring, which works with a transfer rate of up to 150 Mbit per second. For the COMAND remote control function, digital radio technology is used for the first time instead of infrared technology. This makes operation throughout the vehicle possible from any position.

The well-proven SPLITVIEW system for the driver and front passenger has been retained. The COMAND Online system forms a mixed image from two separate display images (e.g. TV and navigation). This is then separated in the high-resolution central display by means of prisms, enabling different screen content to be shown for the driver and front passenger depending on the viewing angle. The driver and front passenger therefore see different images – the passenger can watch television, for example, while the driver is following the navigation instructions.

"Individual Entertainment in the rear" includes a further DVD player (in the centre console for the five-seater, in the parcel shelf for the four-seater), two high-resolution 10-inch displays, radio remote control, two RF headphones, two USB connections and one AUX-in connection.

With Frontbass and up to 24 loudspeakers: the sound systems

The innovative **Frontbass system** developed by Mercedes-Benz and used in the S-Class for the first time in a saloon car is a feature common to all the audio systems: the woofers are mounted in the firewall and use the space within the cross-member and side member as a resonance chamber of almost 40 litres. As no woofers now need to be accommodated in the doors, the irritating vibrations that are typical of such configurations are eliminated. The mid-range speakers in the doors are relocated upwards. This improves sound brilliance and allows additional stowage space in the doors.

As alternatives to the standard sound system with ten loudspeakers, two very high-quality audio systems are available which were developed together with the high-end audio specialist Burmester: the **Burmester® Surround Sound system** and the **Burmester® High-End 3D Surround Sound system**.

The features of the three sound systems at a glance:

	Standard sound system	**Burmester® Surround Sound system**	**Burmester® High-End 3D Surround Sound system**
Loudspeakers (tweeters/mid-range/lower mid-range/Frontbass/ Bassbox) **Total**	4/4/0/2/0 **10**	4/7/0/2/0 **13**	9/8/4/2/1 **24**
Total loudspeaker output	100 watts	590 watts	1540 watts
Additional amplifier	-	DSP multi-channel amplifier with nine active channels	24-channel amplifier, analogue diplexer, additional amplifier for woofer
Sound Presets		Surround	Pure/Easy Listening/Live/ Surround/3D Surround
Specials	Speed-sensitive volume adjustment (SSVA)	Front/rear sound optimisation Vehicle Noise Compensation (VNC)	3D Surround Sound VIP Setting Vehicle Noise Compensation (VNC)

The systematic use of analogue diplexers in the medium and high frequency ranges ensures an extraordinarily expressive and natural sound. Bass, mid-range, treble, volume, balance and fader can be individually adjusted. The listening experience can be enhanced even further with the Surround function or sound optimisation for the front and rear seats.

Three-dimensional in-car sound: Burmester® High-End 3D Surround Sound system

The optional Burmester® High-End 3D Surround Sound system offers a unique visual and acoustic experience. The tweeters in the mirror triangles of the front doors are a particular visual highlight. They rotate through 360° when the head unit is turned on, moving ten millimetres towards the passengers in a spiral motion. This movement aligns the tweeters to give the optimum sound impression. This system is also visually distinguishable from the Burmester® Surround Sound system by three overhead speakers and special door speaker covers.

The Burmester® High-End 3D Surround Sound system provides the most exquisite listening enjoyment, with sound settings that are optimised for every occupant and, for the first time in a luxury saloon, three-dimensional surround sound as standard. This 3D Surround Sound is created with the help of special Burmester algorithms and three loudspeakers integrated into the headlining. A combination of analogue and digital technologies produces an exceptionally expressive and natural sound – the Burmester "feel-good sound".

If the ambience lighting is switched on, the two tweeters are illuminated in one of the seven available colours. The same applies to the overhead console, which is also elegantly emphasised by the ambience lighting and accommodates two of the three overhead speakers.

The Burmester® High-End 3D Surround Sound system provides its unrivalled listening experience by virtue of 24 high-performance speakers and 24 separate amplifier channels with a total output of 1540 watts. Its intelligent combination of analogue and digital amplifier technologies leads to an unparalleled mix of fine, natural sounds and high power reserves. While sophisticated filter circuits ensure the best possible detailed reproduction in the medium- and high-frequency ranges, the digital amplifier masters the highest dynamic peaks despite its compact dimensions. The result is the

greatest possible resolution and fine detail, combined with an impressive impulse reproduction. It produces a warm, substantial sound experience with an imposing bass backdrop.

The new, three-dimensional listening experience provided by the 3D Surround Sound system and created by the Burmester speakers integrated into the vehicle roof is unique. In addition to the two speakers in the overhead console, another speaker is accommodated in the overhead control panel. A 3D algorithm was developed specifically for the new S-Class to provide an unrivalled listening impression with these roof loudspeakers. The aim of the developers was to lend an unobtrusive spatial dimension to the exquisite sound quality.

Apart from 3D Surround, four other preset sound modes can be selected to suit every taste and audio source:

- Pure: audiophile sound reproduction with no additional effects, for unadulterated musical enjoyment
- Live: appealing, dynamic sound background akin to live music
- Easy Listening: milder sound background for relaxed listening over longer periods
- Surround: virtual surround sound
- 3D Surround: three-dimensional listening experience provided by the overhead loudspeakers

Using the so-called VIP setting, the sound quality can be optimised for any of the four seating positions. This function has been carefully configured for each of the sound modes shown above.

The sophisticated noise compensation (VNC) technology has also been developed further. This ensures that the best possible sound impression is maintained despite changes in driving noise. VNC guarantees maximum listening pleasure at all times – whether on the motorway or in town.

Helpers in the background

- **Real Life Safety plus Intelligent Drive**
- **New assistance systems with significantly extended functions**
- **Stereo camera allows a spatial view**
- **Multi-stage radar sensors for close and long range**

Preventing accidents and minimising their consequences: This is the holistic approach taken by Mercedes-Benz accident research and to which the company has given the name "Real Life Safety". Mercedes-Benz is consistently pursuing this strategy with a host of new assistance systems and systems with significantly extended functions. Comfort and safety are being enhanced at the same time. This opens up new perspectives for car drivers and automobile developers. Mercedes-Benz calls this "Intelligent Drive". The new functions use the same sensor system – a new stereo camera and multi-stage radar sensors.

The support functions range from relieving the burden on the driver and therefore increasing comfort, to issuing visual, acoustic and/or tactile warning signals, to boosting the driver's reactions. Some systems are even able to take corrective action in an emergency, such as autonomous applications of the brakes to prevent an accident or lessen its severity. Here is a summary of the new assistance systems and those with notably enhanced functionality:

- **DISTRONIC PLUS with Steering Assist and Stop&Go Pilot** takes the burden off the driver when it comes to lane guidance, and is also able to follow vehicles in traffic jams semi-autonomously.
- For the first time, thanks to the stereo camera, the **Brake Assist system BAS PLUS with Cross-Traffic Assist** is able to detect crossing traffic and pedestrians too, and to boost the braking power applied by the driver accordingly.
- If the lane markings are broken lines, **Active Lane Keeping Assist** is able to detect when the adjacent lane is occupied, especially by oncoming traffic, and reduce the risk of the vehicle leaving its lane unintentionally by applying the brakes on one side.
- **Adaptive Highbeam Assist Plus** allows the high-beam headlamps to be kept on permanently without dazzling traffic by masking out other vehicles in the beams' cone of light.

- **Night View Assist Plus** has been further improved and supplemented with a thermal imaging camera. Night View Assist Plus can alert the driver to the potential danger posed by pedestrians or animals in unlit areas in front of the vehicle by automatically switching from the speedometer to a crystal-clear night view image and highlighting the sources of danger. A spotlight function is furthermore able to flash any pedestrians detected ahead.
- **ATTENTION ASSIST** can warn of inattentiveness and drowsiness in an extended speed range and notify drivers of their current state of fatigue and the driving time since the last break, offers adjustable sensitivity and, if a warning is emitted, indicates nearby service areas in the COMAND navigation system.

Sensors: intelligent networking of eyes and ears

Mercedes-Benz is making a major leap forward with the introduction of the Stereo Multi-Purpose Camera (SMPC), or stereo camera for short. Just like the Multi-Purpose Camera (MPC) fitted previously, it is positioned behind the windscreen in the vicinity of the rear-view mirror. It has an aperture angle of 45° and is capable of detecting the position and movement of objects, especially vehicles and pedestrians, in three dimensions. For the first time the "6D Vision" technology nominated for the German Research Award last year is employed here. Thanks to two "camera eyes" it is able to register spatially an area of up to around 50 metres in front of the vehicle, and monitors the surroundings ahead of the vehicle to a distance of up to 500 metres. The new camera supplies data that are processed further by various systems.

Intelligent algorithms evaluate this information in order to detect and carry out spatial classification of vehicles that are driving ahead, oncoming or crossing, as well as pedestrians and a variety of traffic signs and road markings within a large field of vision.

Whereas the stereo camera's lenses act as the car's eyes, the radar sensors are its ears, so to speak, and provide additional data about the distance from objects. The system of radar sensors comprises two short-range radar sensors in the front bumper and in the side of the rear bumper with a range of 30 m and a beam angle of 80°. It is complemented by a long-range radar (200 m, 18°) including medium-range detection (60 m, 60°). In addition, the multi-mode radar (80 m, 16° and 30 m, 80°) fitted at the front of the standard vehicle

with COLLISION PREVENTION ASSIST is installed in the middle of the rear bumper. The data from the camera and radars are amalgamated in a control unit in order to provide the system-specific data for the various functions.

Comfort-enhancing assistance with lateral lane guidance:
DISTRONIC PLUS with Steer Assist and Stop&Go Pilot

This basic radar-based function has now been enhanced by the addition of **Steering Assist with Stop&Go Pilot**, which helps drivers to stay centred in their lane by generating the appropriate steering torque when travelling on a straight road and even on gentle bends.

The stereo camera recognises lane markings as well as vehicles driving ahead together with their spatial positioning, and relays this information to the electric steering assistance system. By generating the appropriate steering torque, the system can enhance ride comfort in the speed range up to 200 km/h and greatly assist the driver in many traffic situations. At speeds up to 60 km/h, the Stop&Go Pilot 'intelligently' decides whether to use the vehicle in front or the road markings as a means of orientation, enabling semi-autonomous tailback tracking even when there are no clear lane markings visible. The system fuses the data gleaned from the stereo camera and the radar sensors, calculates any reactions required, and then regulates the vehicle's linear speed as requirements dictate by controlling engine power, transmission and brakes, as well as actuating the electric steering for lateral vehicle guidance.

DISTRONIC PLUS with Steering Assist can be activated as before with a stalk on the steering column in a speed range from 0-200 km/h, now also with the vehicle standing still and no vehicle moving ahead of it. Any speed between 30 km/h and 200 km/h can be selected as the desired cruising speed. The driver starts off in this case by pulling the DISTRONIC PLUS stalk or tapping the accelerator.

A green steering wheel symbol appears in the instrument cluster to indicate when Steering Assist is operating while DISTRONIC PLUS is activated. Meanwhile, linear controlling actions (cruise control function) continue to be visualised in the speed display by means of circular segments and the speedometer needle.

The system's design is so refined that the sensors can detect whether the driver's hands are actually on the steering wheel. If the system recognises that the driver has taken his/her hands off the steering wheel while the car is moving, depending on the situation, the detected surroundings and the speed, a visual warning is first issued in the instrument cluster; then a warning signal sounds and Steering Assist is deactivated. This is additionally indicated by changing the steering wheel symbol from green to white. The linear control action remains unaffected by this and continues to be available. That means the system has an intelligent hands-off detection feature that brings the driver's hands back to the wheel when necessary. The use of DISTRONIC PLUS requires no change in driver behaviour – those who previously drove hands-free in a tailback can continue to do so (much more safely). Thus, Mercedes-Benz offers relaxed driving mainly over long distances and on motorways, especially during otherwise tiring and annoying (slow) tailback tracking.

The performance capabilities of the basic DISTRONIC PLUS function have been increased once again. Now the system is able to brake at a rate of up to 5 m/s^2 without any intervention from the driver. If the "S" transmission mode button is pressed, the rate of acceleration increases too. Vehicle acceleration is also far more dynamic if the driver signals a wish to overtake by switching on the indicators, assuming the adjacent lane is clear.

By combining the radar and camera data, DISTRONIC PLUS is now also able to detect both vehicles cutting in and vehicles ahead, and vehicles ahead of them, in one's own lane and in adjacent lanes, and take any necessary action promptly. This can prevent, for example, illegal overtaking on the inside lane on motorways and similar multi-lane highways by adapting the speed to that of vehicles in the outside lanes (at speeds above 85 km/h), especially when a tailback begins to dissolve and in streams of traffic. At lower speeds, permissible overtaking on the inside lane with a maximum speed differential of 20 km/h is possible.

It goes without saying that drivers can always override DISTRONIC PLUS with Steering Assist. For instance if they signal with their indicators that they wish to change lanes, the lateral assistance remains passive as long as it takes to change lanes.

Braking assistance also for crossing traffic:
BAS PLUS with Cross-Traffic Assist

City centre junctions are major accident blackspots. The collisions here can mostly be put down to driver distraction or misjudgement. Whereas humans often react too slowly, assistance systems are immune to that brief moment of shock.

Apart from material damage, accidents at junctions often result in serious personal injuries. The new Brake Assist BAS PLUS from Mercedes-Benz is therefore capable of more than just helping the driver to avoid collisions with vehicles ahead or lessen their consequences in a purely linear direction: the new **Cross-Traffic Assist** function can also come to the driver's aid in critical situations with cross-traffic at junctions.

If this anticipatory system detects a hazardous situation of this type, it prompts the driver to start emergency braking by activating visual and acoustic warnings. If the driver presses the brake pedal too tentatively, BAS PLUS will step in by automatically boosting brake pressure for effective emergency braking, even applying the brakes at full power if necessary. Applying just the right amount of braking power for the situation at hand maximises the available braking distance for traffic behind.

The Cross-Traffic Assist function is operative at speeds up to approx. 72 km/h, while BAS PLUS is able to aid the driver in linear situations at any speed.

Brake Assist BAS PLUS with Cross-Traffic Assist is potentially able to either prevent or lessen the severity of around 27 percent of all accidents at road junctions resulting in injury. This equates to some 20,000 accidents a year in Germany alone (Source: investigations carried out by GIDAS – German In-Depth Accident Study – and Mercedes-Benz accident research).

Detects broken lines too: Active Lane Keeping Assist

The new improved version of Active Lane Keeping Assist is now also able to intervene should the driver inadvertently cross a broken line when the neighbouring lane is not clear, meaning that a lane change could result in the risk of a collision. The system can determine if this is the case using the information from the stereo camera and the radar system. The latter has been

supplemented by a sensor at the rear, which works in unison with the other sensors in the front and rear bumpers.

Active Lane Keeping Assist is not only capable of recognising critical situations such as overtaking vehicles, vehicles to be overtaken and parallel traffic, it can also respond effectively to oncoming traffic. If the system detects that the vehicle is crossing the lane markings when the adjacent lane is not clear, not only does it cause the steering wheel to vibrate in pulses as a tactile warning for the driver, it guides the vehicle back into lane by applying a corrective braking force on one side via ESP®, now also when the vehicle crosses broken lines. It thereby complements Active Blind Spot Assist, and for the first time also enables collisions with oncoming traffic, which can often have far-reaching consequences, to be avoided.

Active Lane Keeping Assist is active at speeds between 60 and 200 km/h. If driver activity in the form of active steering, braking or acceleration is detected, for example, or when the indicators are switched on, both the warning and the corrective brake actuation are suppressed. Using the instrument cluster the system can be set for two levels – Standard or Adaptive.

Now also identifies no-overtaking zones and no-entry signs:
Traffic Sign Assist with wrong-way warning function

A new Traffic Sign Assist which builds on the capabilities of the previous Speed Limit Assist represents yet another contribution to accident prevention from Mercedes-Benz. The system is now also able to recognise no-overtaking zones and alert drivers to no-entry restrictions.

The camera on the inside of the windscreen continues to pick up speed limit signs, including those on overhead gantries and in roadworks, for example. The camera's data are cross-referenced against the information in the navigation system and can be displayed in both the instrument cluster and the map view. If the camera fails to spot any road signs showing a speed limit or a speed limit is lifted, the legal speed limits based on the navigation data are shown instead, such as a maximum speed of 100 km/h on country roads in Germany or 50 km/h in built-up areas. Supplemental signs are also recognised and displayed according to situation (e.g. "in the wet").

No-overtaking zones and the signs cancelling them are also registered and displayed. In the case of signs imposing access restrictions, the wrong-way driver warning function emits an acoustic warning together with a visual warning in the instrument cluster – making an effective contribution towards the prevention of serious accidents caused by wrong-way drivers.

Visualising drowsiness: ATTENTION ASSIST

A quarter of all motorway accidents in Germany are put down to drowsiness, making it one of the most frequent causes of accidents, most of which are of a serious nature. In 2009, Mercedes-Benz presented ATTENTION ASSIST, which is able to detect tell-tale signs of inattentiveness and increasing drowsiness based on changes in steering behaviour and a host of other factors.

The system has been subject to ongoing development, and the latest version has the ability to detect drowsiness and inattentiveness across a far greater speed range from 60-200 km/h. Furthermore, the system's sensitivity can be adjusted, for example for drivers who already feel tired when they get behind the wheel.

A new menu in the instrument cluster display also makes the system more tangible and transparent for the driver by visualising the current ATTENTION ASSIST level and the driving time since the last break. What's more, it is also possible to see whether the system is active in the current driving situation. If the usual ATTENTION ASSIST warning recommending the driver to take a break is emitted, nearby service areas can be indicated in the navigation system.

The system can be deactivated by making the appropriate selection in the instrument cluster menu. However, it will always be automatically reactivated with the sensitivity setting last selected the next time the vehicle is started.

Automatic manoeuvring into and out of parallel and end-on parking spaces: Active Parking Assist with PARKTRONIC

Active Parking Assist with PARKTRONIC allows automated parking with active steering and brake control **in both parallel and end-on spaces**. It is an advanced version of the PARKTRONIC system with Parking Guidance offered previously. What is more, the system is now also able to manoeuvre out of

parallel parking spaces again all by itself with automatic steering and brake control, assuming the vehicle was parked there automatically beforehand.

When travelling at speeds below 30 km/h, ultrasonic sensors with an extended range in the bumpers' side sections survey the nearside of the road for suitable parallel and end-on parking spaces. The same procedure is carried out for the far side of the road if the driver indicates accordingly. A symbol in the instrument cluster shows that the system is in the process of measuring. If a suitable parking spot is identified, an arrow appears alongside the symbol indicating that the system is ready for automatic parking. All the driver now has to do to activate the system is engage reverse gear and confirm by pressing the OK button on the steering wheel.

Active Parking Assist with PARKTRONIC steers and brakes the vehicle automatically as well as indicating the required driver actions in the display each time, such as the gear to be selected. The driver moves the vehicle by lightly pressing the accelerator or releasing the brake.

Prevention is better than cure

- **Prevention of pedestrian accidents and rear-end collisions in urban traffic**
- **Reducing the risks posed by traffic following behind**
- **Extending the protective function of the seat belt**

Ten years ago, Mercedes-Benz unveiled a groundbreaking safety concept in the form of the PRE-SAFE® anticipatory occupant protection system, which has been undergoing continuous refinement ever since. Now, the safety pioneer is increasing protection levels once again. The new PRE-SAFE® functions can help to prevent collisions with pedestrians and vehicles ahead in city traffic, defuse dangerous situations caused by traffic behind and enhance the protection offered by the seat belts.

- **The PRE-SAFE® Brake** can now also detect pedestrians and initiate autonomous braking to avoid a collision at speeds up to 50 km/h.
- **PRE-SAFE® PLUS** can recognise an imminent rear-end collision and warn following traffic by activating the rear hazard warning lights at a high frequency. If the danger of a collision persists, the system can also firmly apply the stationary vehicle's brakes and thus minimise the risk of whiplash injuries by reducing the forward jolt caused by the impact. This can additionally reduce the risk of secondary accidents. Immediately before impact, the PRE-SAFE® anticipatory occupant protection measures are deployed.
- With **PRE-SAFE® Impulse**, the driver and front passenger are pulled away from the direction of impact by their seat belts at an early phase of the crash, before the resulting occupant deceleration sets in. Consequently the risk and severity of injuries in a frontal collision are reduced significantly.

Including pedestrian detection and City Brake function:
BAS PLUS with Cross-Traffic Assist and PRE-SAFE® Brake

Pedestrian detection has been added to the BAS PLUS with Cross-Traffic Assist and PRE-SAFE® Brake functions, while autonomous braking for vehicles in front has undergone a major enhancement too.

Thanks to the combination of stereo camera and radar sensors, it is now possible to detect pedestrians in front of the vehicle. Visual and acoustic warnings are triggered when a hazard is detected. If the driver then reacts by braking, the braking power will be boosted by BAS PLUS with Cross-Traffic Assist as the situation requires, right up to a full brake application. If the driver fails to react, the PRE-SAFE® Brake brakes the vehicle autonomously. PRE-SAFE® Brake with pedestrian detection is active up to approx. 72 km/h, and is able to prevent collisions with pedestrians autonomously up to an initial speed of 50 km/h.

Evaluations of GIDAS accident data by Mercedes-Benz indicate that this new technology could avoid six percent of pedestrian accidents and reduce the severity of a further 41 percent. The operating range of the autonomous braking function for stationary vehicles has been optimised so that rear-end collisions can likewise be avoided at speeds of up to 50 km/h.

BAS PLUS with Cross-Traffic Assist and PRE-SAFE® Brake with pedestrian detection rely on the same sensors employed for the adaptive cruise control DISTRONIC PLUS with Steering Assist and Stop&Go Pilot: the new stereo camera plus the multi-stage radar sensor system.

Safety measures in response to an imminent rear impact:
PRE-SAFE® PLUS

PRE-SAFE® PLUS is an extension of the familiar occupant protection measures when dangers are posed by following traffic. A radar sensor in the rear bumper monitors the traffic following behind the car. If an impending rear-end collision is recognised, the driver of the vehicle following behind is warned by high-frequency (5 Hz) flashing of the rear hazard warning lamps (not for vehicles with country code USA/Canada). When the car is at a standstill and the driver indicates a wish to remain stationary (for example by keeping the brake pedal depressed, activating the HOLD function or engaging transmission position "P"), PRE-SAFE® PLUS provides support if the collision danger persists by increasing the brake pressure. The vehicle's brakes are "locked". Immediately before impact, the PRE-SAFE® anticipatory occupant protection measures, especially the reversible belt tensioners, are also deployed.

Keeping the vehicle firmly braked when another vehicle hits it from behind greatly reduces the risks to the occupants, such as that of whiplash injuries. At the same time, it serves to protect other road users by restricting uncontrolled vehicle movements after the initial impact that could lead to secondary collisions, such as being shunted into a vehicle in front or colliding with pedestrians or other road users at junctions.

Intelligent counteraction: PRE-SAFE® Impulse

Mercedes-Benz is extending the front seat belt's protective function with the introduction of PRE-SAFE® Impulse: at an early phase of the crash, before the resulting deceleration sets in, the front occupants are pulled away from the direction of impact and deeper into their seats by their seat belts. By the time the accident enters the phase when loads peak, the extra distance they are retracted by can be used while dissipating energy in a controlled fashion thanks to additional force limiting in the belt buckle. Pre-acceleration and force limitation allow the occupants to be temporarily isolated from the effects of the crash. Consequently the risk and severity of injuries in a frontal collision are reduced significantly.

With PRE-SAFE® Impulse, the seat belt strap can be retracted by pyrotechnical means at all three belt anchorage points, both in the pelvis and chest area, and released again with controlled force at the buckle and in the shoulder area. The fundamental difference compared to conventional belt tensioners is that the force for retracting the belt strap is maintained more consistently for a much longer time. The deployment logic fires the seat belt system's belt tensioners progressively depending on the seriousness of the accident. In this way, the tensioning force can be adapted as required. The PRE-SAFE® Impulse system is integrated into the seat's structure and supplements the pyrotechnical reel tensioner with a pyrotechnical buckle and anchor fitting tensioner including central gas generator.

After a crash: POST-SAFE functions of the new S-Class

Not every accident can be avoided. That is why engineers at Mercedes-Benz have integrated a host of functions into the safety concept for the S-Class that can facilitate casualty rescue in particular. This includes a recent innovation by Mercedes-Benz: using a QR-code applied to the inside of the fuel filler flap and to the B-pillar on the opposite side of the car, the emergency services have

rapid access to all vehicle data relevant for rescue purposes. This is because the QR-code provides a direct link to a website containing the vehicle-specific rescue card.

Other POST-SAFE functions include:

- Activation of the hazard warning system to warn other road users
- Warning following traffic to protect the occupants from any secondary accident
- Activation of interior lighting to help casualties and emergency services at night
- The central locking system is unlocked for easier access by the emergency services
- Closed side windows are lowered to allow venting of smoke from activated airbag systems and give the occupants a clear view (orientation/avoiding panic)
- The electrically adjustable steering column is raised to facilitate rescue or egress by the occupants
- The belt buckles on the rear seats are extended and illuminated, allowing easier access to the buckle and thereby facilitating rescue or egress by the occupants
- Mercedes-Benz emergency call system activated to notify emergency services of the location and emergency situation and initiate rescue
- Automatic engine cut-off to prevent hazards and to stop the vehicle moving unintentionally
- High-voltage power supply switched off on hybrid vehicles to cut the voltage to the vehicle during rescue

Top safety level for the rear

- **Belt buckle extender, beltbag and cushionbag in the rear**
- **Innovations to improve both safety and comfort**

Mercedes-Benz is further reinforcing the safety system for passengers in the rear with the seat belt buckle extender, the beltbag and the cushionbag. In contrast to many other manufacturers, the seat belts in the rear already include belt tensioners and belt force limiters today. Both systems were furthermore developed with a particular view toward new markets in Asia. There, the occupancy rate in the rear is as much as 30 percent, making it much higher than in Europe.

Reducing the belt slack: the seat belt buckle extender

In the active belt buckle, an electric motor automatically raises and lowers the buckle. This makes for easier seat belt attachment and reduces any belt slack in the area of the pelvis and thorax, so that passengers are secured more firmly in both the sideways and lengthways direction.

The belt buckle extended follows the integral safety concept of Mercedes-Benz. As a systematic implementation of the safety priority, this concept covers all phases of automobile safety: from safety while driving to safety in hazardous situations, and from protection in an accident to minimisation of the consequences.

The innovation is classic Mercedes-Benz, improving safety and comfort in one. This is because fastening seat belts in the rear is also made much simpler: the seat belt buckle emerges from the upholstery when the rear doors are opened and is provided with an illuminated insertion slot. Simplifying use of the seat belt in this manner may increase the percentage of rear passengers who buckle up. It also makes it easier to assist children or people who require help in fastening their seat belts.

The seat belt buckle extender is furthermore integrated into the PRE-SAFE® anticipatory safety system. This means that whenever PRE-SAFE® becomes active in critical driving situations or when the system detects the vehicle

approaching other objects at a critical speed, reversible belt tensioning is also performed in the rear via the seat belt buckle extender function. The restraint system and the passengers are thus better prepared for a possible accident situation. In this way, the seat belt buckle extender complements the pyrotechnical belt tensioning which has featured as standard on all outer rear seats in Mercedes-Benz vehicles for many years now, and is triggered in the event of an impact exceeding a certain severity.

The seat belt buckle extender is a motorised belt buckle which can be extended upwards by up to 50 millimetres and retracted by up to 40 millimetres. The belt buckle is attached via a cable to a nut which runs on a spindle, translating the electric motor's rotary movement into a linear movement.

The following functions are carried out by means of this movement:

- **Seat belt reminder/fastening aid**: The seat belt buckle extender is provided with an illuminated insertion slot, attracting the occupants' attention to the buckle. Particularly in the dark, this makes it easier to find the belt buckle and connect it with the seat belt tongue. In addition, the belt buckle is extended by up to 50 millimetres when occupants enter the rear of the vehicle, to facilitate fastening of the seat belt. When extended, the belt buckle is more readily accessible and it is easier to insert the belt tongue. Both functions are activated when the doors are opened by passengers entering the rear of the vehicle.
- **Minimised belt slack**: After the belt tongue has been inserted, the belt buckle returns to its original position. This reduces any belt slack in the area of the pelvis and thorax, and ensures that the belt fits correctly in the pelvis area.
- **PRE-SAFE® function for rear occupants**: The seat belt buckle extender is fully integrated into the vehicle's PRE-SAFE® system. Whenever PRE-SAFE® becomes active in critical driving situations or when the system detects the vehicle approaching other objects at a critical speed, reversible belt tensioning is now also performed in the rear via the seat belt buckle extender function. The restraint system and the passengers are thus better prepared for a possible accident situation. In contrast to its extended position to facilitate fastening of the seat belt, the belt buckle is retracted by approx. 40 millimetres instead. This reversible function tightens the belt on the occupant by up to 80 millimetres. In addition, the belt buckle branches off at a

lower point at the occupant's hip. This reduces the risk of the pelvis submarining under the belt. Securing the occupants more effectively in this way can reduce the stresses to which they are exposed in the event of an accident. The seat belt buckle extender complements the pyrotechnical belt tensioning which has featured as standard in Mercedes-Benz vehicles for many years now, and is triggered in the event of an actual impact.

- **POST-SAFE functionality**: To facilitate the rescue of occupants and to assist rescue personnel or the occupants themselves in unbuckling the seat belts, the belt buckle is extended once again as soon as the doors are opened by rescue personnel or the occupants themselves after the system has detected a crash and the vehicle has come to a standstill, provided that the on-board electrical system is intact. The raised belt buckle position allows better access from inside the vehicle, while illumination of the buckle draws attention to the opening mechanism.

An airbag for seat belts: the beltbag

The beltbag is an inflatable seat-belt strap that reduces the load on the ribcage in a head-on collision and is thus able to reduce the risk of injury to passengers in the rear. Because dummy measurement technology is not capable of quantifying the benefits resulting from a wider belt strap, such as the lower force exerted on occupants in the rib area in particular, the safety experts at Mercedes have been working extensively with virtual human models too, as such computer-generated models make it possible to obtain detailed findings on the biomechanical strain during a collision.

Should the crash sensors detect a severe frontal impact, the airbag control unit triggers deployment and inflation of the beltbag. A gas generator then inflates the multi-layered belt strap with Velcro seams to nearly three times its normal width. The resulting larger surface area is able to better distribute the force acting on the seat occupant, thereby reducing the risk of injury.

The beltbag is used in exactly the same way as a conventional seat belt. The belt strap's design is different from that of the standard belt though, and received top marks in practical trials for being extremely comfortable to wear and for its extra-soft belt strap edge.

An airbag for the seat: cushionbag

If the S-Class is equipped with the Executive seat (reclining seat), the seat includes the innovative **cushionbag** as standard. The airbag is located under the seat cushion upholstery, but on top of the plastic seat shell, which is moved by the seat mechanisms. This means that the airbag is always in the right position relative to the occupant.

In an accident, with the occupant in a reclined position on a flat seat cushion, without additional measures there would be a danger of the pelvic area sliding beneath the seat belt (submarining). This can be prevented by the cushionbag, as it raises the front section of the seat cushion upholstery. The airbag is only activated if the seat is in the reclined position during a crash. It is not activated in the upright position, as there is then no danger of submarining.